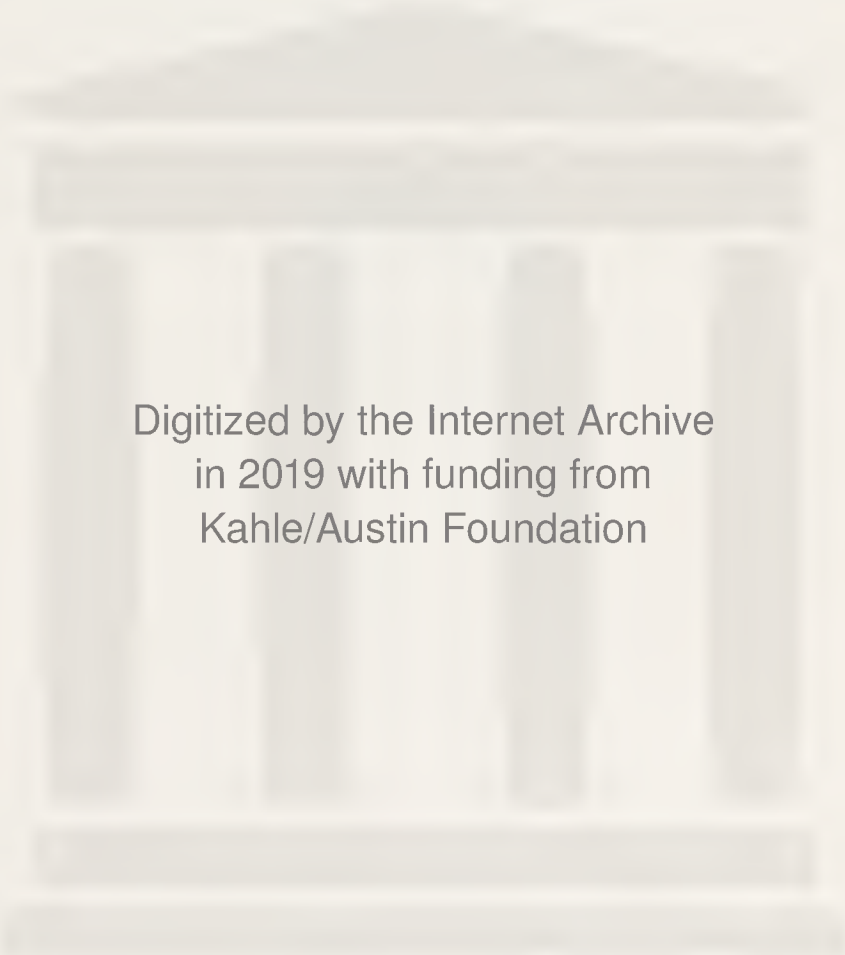


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SOUTHWEST MUSEUM PAPERS

Number Four

Archeological Explorations
in Southern Nevada



Report of the
First Sessions Expedition
1929

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Published by the
SOUTHWEST MUSEUM
Highland Park, Los Angeles. California

JUNE, 1930
(Reprinted 1970)

F969 . L4S65 no. 4 1930



The Southwest Museum

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Fig. 1. Map of Southern Nevada, showing situation of the Moapa Valley.

ARCHEOLOGICAL EXPLORATIONS IN SOUTHERN NEVADA

I. INTRODUCTION

M. R. Harrington, Curator, The Southwest Museum

Southern Nevada is a country of unusual beauty and grandeur, —of towering mountain ranges, great valleys, wide-stretching plains, —but most of it is desert. And while the desert is often wonderful to look upon, it always must be treated with respect. In ancient times it was not an easy country for human beings to live in. Over a large part of such territory, only the initiate—the men and women who knew every tiny trickle of water hidden in remote canyons, every natural pot-hole in the ledges where a few drops might gather after a summer cloudburst—could hope to live at all.

In more humid regions, with springs and streams, ponds and lakes on every hand, man can be more independent and has considerable freedom of action; but in the desert his every move, even today, is controlled by one thing above all others: water-supply.

Wandering hunter tribes in such a place needed but little water, yet the traces of their camps are rarely seen more than a mile or so from spring or water-hole; and when we come to more advanced people, the farming tribes, who needed much more of the life-giving fluid, it is very unusual indeed to find any remains of long-continued settlements far from a substantial water-supply.

Archeology in a truly desert country is thus simplified. Look for your water supply, and there, or within a mile or two, you will find your traces of ancient human life, almost invariably. Find a real oasis, a well-watered locality, and there you will discover not only traces of more primitive peoples but the ruins left by the highest cultures the country in question may have produced, for there alone could such people establish permanent settlements.

Of course there are localities now dry, that were once well-watered, and there are other exceptions, yet the rule holds good in general. There is also such a thing as too much water, or rather such a thing as water that was too hard to handle to be attractive for irrigation purposes to the ancient farmers. Take the valley of the Colorado River, in Nevada. Here we find a swift current, large volume, and high banks, a very difficult combination for the primitive farmer to manage. In fact, it is now requiring all the resources of modern mechanical civilization to build Boulder Dam. Small wonder that most of the ancient human traces we find along the Colorado in Nevada are the remains of temporary camps, and not established settlements.

The Virgin River, tributary to the Colorado in Nevada, was almost as difficult for the ancients to harness, almost as intractable,

and consequently we find the ruins of permanent villages along its course only in the most favorable spots. But when we come to the Moapa or Muddy River, tributary of the Virgin—here is indeed another story. Not too large, yet sufficient in volume to yield all the water needed; with low banks, making it easy to turn the water into ditches with the crudest of brush dams; abundant level land, most of it unusually fertile—high level of ground water; the stream and its valley were well nigh perfect from the aboriginal farmer's viewpoint. Consequently we find an almost unbroken line of ancient villages of various periods from the Muddy's junction with the Virgin to the large springs forming its source some 30 miles to the north. In the lower 16 miles of its course alone there have been discovered no fewer than 77 distinct ancient sites, and from all indications a proportionate number will be found in the upper 14 miles when we are able to investigate fully.

The archeological explorations of the Southwest Museum in 1929 were confined mainly to this lower valley, and the following reports deal with the results obtained from the two excavation projects we completed during the field season. These two projects were the excavation of the Mesa House ruin and of a small cavern known as Paiute Cave, both situated near Overton, Nevada. We also finished a complete reconnaissance of the lower valley, during which the 77 sites mentioned above were visited, noted and located on our map, but this will not be published until farther work has cleared up some of the problems we encountered, especially those concerning our region's earliest dwellers. Reconnaissance trips were also made to the Upper Moapa Valley, to the Mormon Mountain district, and along the Colorado River on the Nevada side.

Before proceeding to the reports on Mesa House and Paiute Cave a general view of the Moapa Valley and its surroundings, its history and summary of our present knowledge of its archeology may be of value in providing a background.

TERRAIN

The Moapa Valley lies in the northeastern part of Clark County, in Southern Nevada, as may be seen on our map (Fig. 1). As already stated, the Valley proper is about 30 miles long, if we figure its beginning at the so-called Muddy Spring—a beautiful warm spring of large volume (Fig. 2), about six miles northwest of Moapa, a railroad station on the Union Pacific Railroad. While the crystal-clear spring is in no sense muddy, the stream that flows from it soon takes on the cloudy appearance that has gained for it the name of Muddy River. Whether this is due to a rapid acquisition of silt, as Longwell states in his valuable report,¹ or whether it is due to

1. Longwell, Chester R., "Geology of the Muddy Mountains," Bulletin 798, U. S. Geological Survey, Washington, 1928, p. 16.

the cooling of the water and consequent precipitation of some substance in solution as thought by some of the Valley residents, is a question I am not prepared to answer.

I take issue with Longwell, however, in the naming of the stream, which he calls Muddy "Creek." To the eye of an easterner it does appear more like a creek than a river, but the name of "River" has been fastened on it by local custom, and I doubt the desirability of changing it. Early Spanish visitors named the stream *Rio de los Angeles*, or "River of the Angels," and I have heard it called "Moapa River," but never "Muddy Creek."

At any rate Muddy River runs southeastward about thirty miles to its junction with the Virgin, and its valley is known as the Moapa Valley. About 10 miles from its source, just below Glendale,—a small settlement at the point where the Zion Park Highway (also known as the Arrowhead Trail) crosses the Valley,—the river runs several miles through a series of canyons known locally as "the Narrows," and these canyons cut the valley in two parts, the portion above "the Narrows" being known as the Upper, and that below as the Lower Moapa Valley.

Within this Lower Valley are a number of small towns and sidings scattered along a branch of the Union Pacific that leaves the main line at Moapa. They are, in order from northwest to southeast; Pueblo Siding, Logandale, Tokio Siding, Overton, Kaolin, and St. Thomas, the terminal. Overton is a village with several stores and a good high school; St. Thomas is next in population; the rest are very small settlements. From the highway ford at the foot of the canyons to the junction of the Muddy and the Virgin, the Lower Moapa Valley measures about 16 miles. It is seldom less than half a mile in width, and reaches its greatest width of nearly a mile and a half near Overton. The whole distance is one continuous sweep of green fields and leafy trees—a precious emerald oasis in a stern desert setting.

Let us look at that setting. To the east the scene is dominated by the towering Virgin Peak, often snow-covered in winter and early spring, and always beautiful, but especially in the evening, when the last rays of the setting sun paint the rugged heights with unbelievable shades of violet and old rose.

Between Virgin Peak and our Valley lies the huge flat-topped bulk of Mormon Mesa. Not far above St. Thomas this is broken by a gap opening into Virgin Valley, but thence northward the Mesa is continuous as far as the eye can reach. At its foot, from the gap up the valley to a point northeast of Kaolin, is a maze of eroded clay bad lands, full of winding gulches and canyons; from this point on, only low gravel terraces and rolling hills lie between the flood-plain and the mesa.

On the west side of the Valley we find its rim composed only of eroded clay bad lands in the northern part, with high gravel-topped mesas and lower gravel terraces for the rest of the distance southward, thus reversing the condition across the valley. Both clay bad lands and gravel benches, however, blend into gradually rising hills westward, only to break, after a few miles, into the weird eroded red sandstone pinnacles of the Valley of Fire, beyond which rise the Muddy Mountains, a little to the south.

To the north the sky-line is dominated by the jagged limestone peaks of Mormon Mountains, with more distant ranges plainly visible from any elevated lookout point.

The valley floor is generally level; its soil, however, is variable, ranging from almost pure sand to pure clay, with many gradations between. In some places there are adobe flats so full of alkali that crops will not grow, but most of the valley seems naturally rich and fertile.

In the southern end, especially on the east side, are scattered sand dunes on the valley floor proper, and there are throughout, especially near the edges, occasional hillocks of harder materials, remnants of land forms now nearly eroded away.

Most of the water-supply today comes directly from the Muddy River, being led about the Valley in canals and ditches; and doubtless a similar condition prevailed in ancient times. However, there is a series of small springs emerging from the foot of the gravel benches along the east side of the Valley from a point at Angel Ranch, a mile below Overton, to another a mile and a half above that village. Some of these springs are warm, but most are not at all disagreeable to the taste. Wells are not a success in the Moapa Valley, on account of the saline character of the ground-water, so the present people of the Valley at certain seasons of the year run the water from lateral ditches originating in Muddy River into cisterns and there let it settle. It is then used for domestic purposes.

I can say this much for the water; there seems to be very little disease in the Moapa Valley of the kinds ordinarily blamed on bad water. The settled ditch water has a slightly salty taste, but one becomes accustomed to it in time.

The portion of the Muddy River not diverted into ditches now meanders through the bottom lands, much as it must have done in Indian days, with one exception—the little river is now and has been, it is said, since 1880, cutting a deep gully for itself, which, if it continues, will some day make it very difficult to get water for irrigation purposes, and will considerably lower the ground-water level.

Another major change since Pueblo days is the disappearance of a large swamp that formerly occupied a part of the upper end of the Lower Valley. This was completely covered a few years ago by a heavy blanket of soil brought down by a flood from the Meadow Val-

ley Wash, which enters the Moapa Valley from the east a few miles above the Narrows. It is interesting to note that this flood deposited very little of its earthy burden until it emerged from the canyons and struck the great swamp with its acres of "tules" or rushes. Here it spread out, the force of the current was broken, and the soil was deposited. Today, the only swamps to be seen in the Lower Valley are near the springs in the vicinity of Angel Ranch.

GEOLOGY AND MINERAL RESOURCES

The geology of this region has been fully reported by Longwell,² to whose interesting monograph the reader's attention is invited; but for our present purpose the purely geological conditions are not especially important. However, should human remains be found contemporary with the eroded clay hills to the east of the Valley, and the top crust of Mormon Mesa, which seem to be Pleistocene, a special study would become necessary. For the present it is sufficient that Longwell considers the foothills to the east and the mesas to the west of the Valley to be of Pliocene origin, and the Valley of Fire formation to be Upper Triassic.

There are certain mineral resources, however, that the Indian prized in his day, most important of which was probably the almost pure rock salt which was mined extensively by the early Pueblos and probably by their predecessors and successors. Some of the mines were merely surface workings open to the sky, but in others the mining of salt was carried on in partly natural, partly artificial caverns a hundred yards or more from daylight. The best of these mines lay about three miles directly south of St. Thomas. The tools used were crude stone hammers and picks, usually chipped from small rounded river boulders, mainly quartzites, and often notched for the attachment of wooden handles—which, in a few cases, were found still in place. These mines have been briefly described elsewhere by the present writer.³

Very important also to the aboriginal inhabitants of the Valley was the flint of which they manufactured arrow and spear-heads, drill-points and knives. This could often be picked up in the alluvial gravel of the terraces as float, but there was one place where the flint-worker could always be sure of finding material: at the upper end of the Lower Valley, where thousands of chips and unfinished objects, lying on the surface of a hill near the river's edge half a mile

2. Longwell, Chester R., *op. cit.*

3. Harrington, M. R., "Ancient Salt Mine near St. Thomas, Nevada," *Indian Notes*, Vol. II, No. 3, Museum of the American Indian, Heye Foundation, New York, July, 1925, pp. 227-231.

Ibid., "A Hafted Stone Hammer From Nevada," *Indian Notes*, Vol. IV, No. 2, April, 1927.

Ibid., "Ancient Salt Mines of the Indians," *Scientific American*, Aug., 1926, pp. 116-117.

below the highway ford, reveal the site of an ancient flint-mine not yet explored.

Pilgrimages seem to have been made to the magnesite beds back of the present village of Kaolin, possibly to get material for the white coating so often used on bowls and jars as a background for the design in black, while among the eroded clay hills could be found material for the body of the vessel of almost any quality desired.

These same hills yielded also sandstone slabs useful as building material and for making hatch-covers, and smaller flat pieces of transparent gypsum crystals (selenite) employed for making charms and ornamental pendants. Rounded river boulders from the gravels were used with adobe as building material in parts of the Valley where sandstone slabs were not to be found at a convenient distance.

For turquoise, as for iron ores yielding red paint and the copper ores of which green and blue were made, it was necessary to leave the confines of the Valley, but all could be had within fifty or sixty miles.

VEGETAL RESOURCES

It would take a botanical survey to list the native plants of the Moapa Valley; the best we can do here is to record some of them we know to have been used by the ancient inhabitants, or which form a prominent feature of the landscape.

The cottonwoods which dot the oasis today and which are so conspicuous, were not there originally, I am told, but were introduced by Mormon settlers, as were also the palms, tamarisks, and of course the fruit trees. The only trees to be seen in the old days were, probably, the mesquite, which haunts the sandy stretches, and its cousin, the screw-bean, locally called "mescrew," which prefers damp spots and adobe flats. These sometimes reached a height of twenty or twenty-five feet, and formed a valuable source of firewood and material for roof-beams in old Indian days. Screw-bean is better than mesquite for beams, being straighter. Related to the mesquites is the "catclaw," thickly provided with disagreeable hook-shaped thorns. The seeds and pods of the mesquite family were used as food.

Pine, and the favorite bow-wood—the juniper—required trips of twenty miles or more to Virgin Peak or Mormon Mountains. There were at least two kinds of willow, useful for basket material, salt-mine hammer handles, etc., but these willows are seldom more than ten feet high. *Martinia* or devil's claw is an annual plant used in basket making. Arrow-brush, used for arrow making, roofs, and wind-breaks, grows nearly as high in damp spots as the willows.

Also used in arrow making is the arrow-cane growing on the very brinks of the river, or in swamps and along ditches; and another dweller in damp ground is the Indian hemp (*apocynum*), one of the most useful wild plants known to Indian industry, the source of most of their cord and string, used, as today, for a hundred different purposes.

I have noticed ten or twelve species of cactus in and near the Valley, but have not had them identified. The fruit of one *mamalaria* and one or two *opuntias* seems to have been relished by recent Indians, and it is said that the whole body of one of the *mamalaria* species was eaten. It is also reported that the sap of the barrel cactus (*echinocactus*) was used for drinking in time of emergency.

There are no yuccas in the Valley, but the ancients used the fiber of at least one species for cordage, sandal-making, etc., and the hearts of another species, the mescal, which when cooked made a favorite food. Both had to be collected at higher altitudes at some distance, especially the mescal, which flourished only in the Virgin and Mormon Mountains and other ranges equally high.

As to cultivated plants used by the Indians, we know that both Early Pueblos and Paiutes, especially the former raised corn (maize). The number of varieties grown and the differences between Moapa Paiute corn and Moapa Pueblo corn have yet to be determined. Mr. James B. McNair of the Field Museum kindly examined a mixed lot of cobs from both horizons and reported that they might all represent one horticultural variety of corn, and that this variety might be starch or flint (probably the former) and not sweet, dent, or pop-corn. One red grain from the Pueblo horizon was distinctly starch corn.

Squashes and gourds figure in the list of native products of both periods; and the Paiutes in addition had melons, the seeds of which were probably obtained from the whites. We found no cotton seeds or bolls; but so many pieces of cotton textiles were recovered in previous work done in the Valley, associated with Early Pueblo remains, that it seems probable that these people planted it.

We shall make no attempt to give a full list of the animal life of the Moapa Valley, but shall merely call attention to such creatures as seem to have been used by the Indians for flesh, skins, horns, and bones. The largest animals known to have been found, and which in fact still exist, are the big-horn or mountain sheep frequenting the mesas west of the Valley; some species of deer, which probably came no nearer than the high Mormon and Virgin ranges; the bob-cat and the coyote; with perhaps occasional visitations from larger wolves, although we have found no identifiable remains of the latter, nor of foxes. Remains of bears and mountain

lions are conspicuous by their absence. The bones of the jack-rabbit and cottontail show these animals to have been abundant in Indian days as now. Remains of several smaller rodents are quite frequent.

A few elk-antler war-clubs have appeared in the ruins in the Moapa Valley; but these, like the beads and ornaments of abalone and other Pacific Coast shells, are evidently importations from the west,—although a species of elk living in Arizona may have yielded the antlers. The only domestic animal seems to have been the dog.

Bird bones are not common, and the few specimens found have not been identified. I can say, however, that there seem to be no bones of the turkey, so common farther east. Today we see various species of eagles and hawks, buzzards, migratory ducks and geese in season, road-runners, valley-quail, and a multitude of smaller species. Some of these birds doubtless furnished feathers, and probably food to the Indian.

What relation the various lizards, horn-toads, snakes, toads and frogs bore to the Indian cultures we cannot tell; except that we know that the large lizard known as "chuckawalla" was a favorite food animal for the Paiute Indians, found in possession of the country by the whites. The desert tortoise however was apparently valued from first to last for his shell, which made a convenient food-bowl and a scoop for digging storage pits and the like. The animal served also as food, at least among the Paiute.

There are a few small fish in the Muddy and in the Virgin, and larger ones in the Colorado; but we have so far found no sign of fish bones in any of our archeological deposits. I have heard however that the Paiute occasionally went fishing in the Colorado River, some twenty-five miles distant from the lower end of the Moapa Valley.

In some of the cliffs wild bees' nests may be found, but whether such were there in early days to furnish honey to the ancients we cannot say.

RECORDED HISTORY

There was an ancient trail which ran down the Virgin from what is now Utah, to its junction with the Muddy, then turned up that stream along its east bank through the Moapa Valley to the California Wash, then struck westward across a forbidding fifty-mile stretch of desert to the Las Vegas Springs, thence from spring to spring across the deserts and mountain ranges into California. Probably it was an ancient Indian trade route, but just what its bearing was on the life of the old people we may never know. We can say, however, that the old trail was most important to the early white explorers and settlers. The first Caucasians to travel it were Spaniards, although the famous discoverer of Nevada, Father Gar-

cés, who must have crossed it farther south and west, early in 1776⁴ and Father Escalante⁵ who possibly used it the same year, farther north and east, never saw the Moapa Valley part of the route. The Spaniards named the Muddy River *El Rio de los Angeles*, possibly because its turbid waters seemed positively angelic to them after the two days "jornada" from Las Vegas Springs without a drop of water *en route*. The trail was used as a road from Santa Fe to Mission San Gabriel by occasional parties and acquired the names of "Old Spanish Trail" and "Santa Fe Trail."

The first "Anglo-Saxon" to see the Moapa was very likely the adventurous Jedediah S. Smith, American trapper and pathfinder who passed along portions of the Old Spanish Trail with a following of kindred spirits in 1826 *en route* from what is now Utah to San Gabriel Mission in California⁶. Frémont traversed it in 1844⁷ eastward bound, and, it is said, had some trouble with the Moapa Paiute.

The first party to travel the old trail with a wheeled vehicle seems to have been a group of 22 men led by one Henry G. Boyle, who made the trip with 135 mules and one wagon from California to Utah after their discharge from what was left of the Mormon Battalion in the Spring of 1848. After the gold discovery in California this trail was frequently used, especially in the winter, when the snow in the High Sierras closed the northern trails, and mail was carried by this route to Los Angeles as early as 1850.⁸ In 1855 it was traveled by a party of Mormons from Utah *en route* to Las Vegas Springs, where they founded a settlement.

The Old Spanish Trail soon became known as the "Mormon Road." This brings us to the beginning of the history of the white man's colonization along the Muddy. The advance guard were Elder Ira Hatch and Thales Haskell, through whose efforts a treaty with the Paiute was negotiated—although it fell through later, it is said, through failure on the part of the Utah Indian Agent to provide articles promised to the Indians. This was in 1858. A few years afterward the differences with the Indians were more or less adjusted and in 1865 Mormon settlers began to come into the Moapa Valley in numbers.⁹ Old Mormons have told me that the principal object of this colony was the raising of cotton for the purpose of making the Mormon people independent of importations from the east. Little they knew that they were probably not the first farmers to plant cotton on the banks of the Muddy!

Trouble over taxes imposed by Nevada resulted in the abandon-

4. Bancroft, Hubert Howe, *The Works of*, Vol. XXV, "History of Nevada, Colorado and Wyoming," pp. 27, 28, 29.

5. *Idem*, p. 36.

6. *Idem*, p. 38.

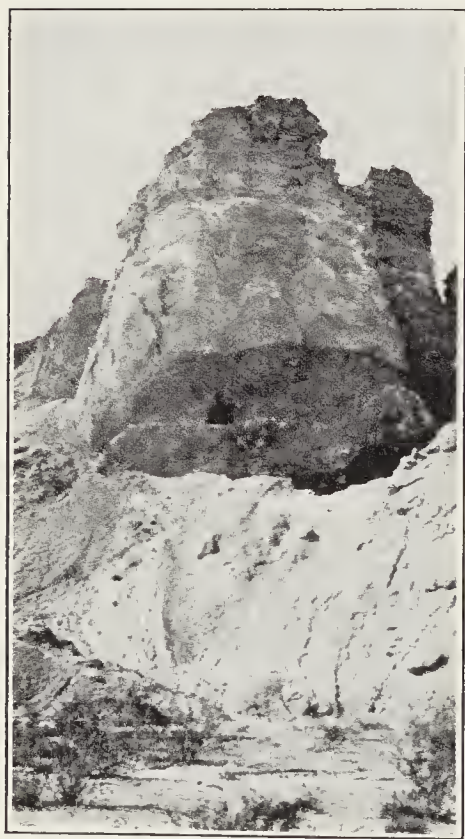
7. *Idem*, p. 39.

8. McClintock, James H., "Mormon Settlement in Arizona," Phoenix, Ariz., 1921, pp. 53-55.

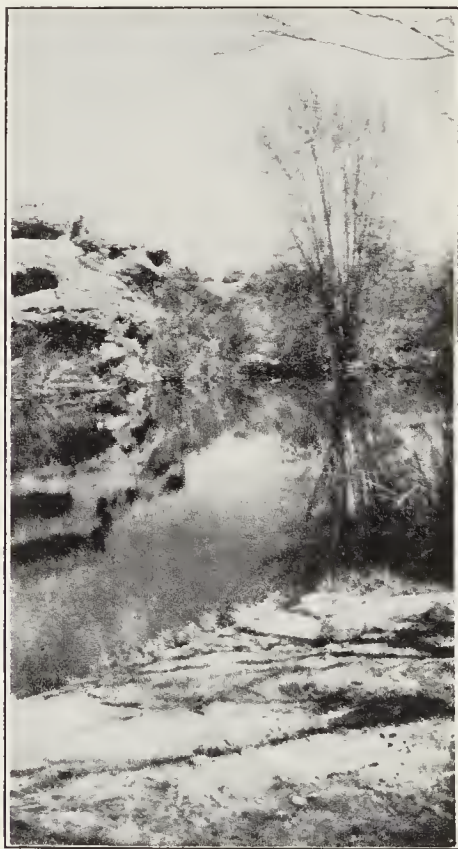
9. *Idem*, pp. 105-108, 118.



On the Old Trail



Jedediah Smith's Cave



Great Springs at Source of Muddy River

Fig. 2. Scenes in the Moapa Valley

ment of the Moapa Valley by the Mormon colony in 1871 but many returned in 1880, although the new colony was not as large as the original one. A ruin of the early Mormon days is shown in Fig. 2. Today the Lower Valley is fairly well populated, and seems reasonably prosperous. Its principal exports, outside of salt and silica sand, are early vegetables and fruits. Cotton has long been abandoned. The population is still predominantly Mormon, although there are a few "Gentiles" including not only Caucasian but Japanese and Korean families.

Finally we find that the old aboriginal trade route, which had become the Spanish Trail and then the Mormon Road, has been followed in general by the Los Angeles and Salt Lake railroad of the Union Pacific system; the Arrowhead Trail for automobiles followed it even more closely, although a recent cut-off makes this road, now known as the Zion Park Highway, merely cross the Moapa Valley and not follow it. Today an aeroplane mail route with beacons parallels the ancient route, and the modern flying-machine makes the trip in hours where the plodding burros and rumbling wagons took weeks.

ARCHEOLOGICAL HISTORY

Before the fall of 1924 little was known of the antiquities of Southern Nevada, although the fact that such might exist had been on record for nearly a century. The first report was probably the letter sent in 1827 by the redoubtable Jedediah Smith to William Clark, then Superintendent of Indian Affairs,¹⁰ concerning Smith's exploration along the Virgin River. In this it is related how Smith discovered a cave in a mountain of salt and found therein an Indian pipe and a flint knife. This cave is probably the one south of St. Thomas, shown in the photograph (Fig. 2).

Bancroft¹¹ quotes an account of the finding of ruins in southeastern Nevada which appeared in the New York Tribune on October 15, 1867, and purports to be an account of the discoveries made by "The Morgan Exploring Expedition." The account, which describes "arches with keystones still perfect" and other things entirely foreign to the region, was plainly more or less a bit of fiction and Bancroft seems to realize this, yet he remarks, "It is just possible that the New Mexican type of ruins extends across into Nevada."

The next reference known to me appears in the American Anthropologist for January-March, 1904 in an article by M. S. Duffield entitled "Aboriginal Remains in Nevada and Utah." In this are mentioned certain caves in the Spring Mountains near Las

10. Dale, Harrison Clifford (Ed.), "The Ashley-Smith Explorations and the Discovery of a Central Route to the Pacific, 1822-29"; Cleveland, 1918, p. 1881.

11. Bancroft, Works, "The Native Races," Vol. IV, Antiquities, pp. 713-714.

Vegas, Nevada, about which were found fragments of pottery, stone implements, etc.

In 1912 Dr. A. V. Kidder visited the Las Vegas district and collected some potsherds, especially in the vicinity of a cave near Jean, where he found ware that he identified as Puebloan, other sherds that seemed Mohave and some Paiute in character. At the same time he was informed of certain camp-sites along the lower Virgin River. He never published this information as such, but it was incorporated in his maps of the early distribution of Pueblo culture.¹² Dr. Kidder was probably the first man to recognize the fact that Puebloan people once occupied or at least visited Southern Nevada.

In May, 1913, came Dr. H. P. Mera of Santa Fe, New Mexico, who visited Tule Springs near Las Vegas and collected a few Pueblo potsherds—a discovery which also remained unpublished.

Mr. N. C. Nelson, of the American Museum of Natural History, seems to have been the next archeological visitor, in January, 1921. He too observed potsherds near Las Vegas, along the banks of the stream to the north and northeast of town, but they were not definitely Puebloan in character. So much for the observers.

Probably the first man actually to attempt excavations in the Moapa Valley ruins was Dr. D. O. Beal, a one-time resident. My information as to his activities is not very detailed, but according to local report he dug into various places and recovered some pottery vessels, turquoise beads and the like. The date I do not know, nor can I say whether he recognized their import or their archeological value. Certainly he seems to have kept his finds pretty much to himself.

Still the real facts concerning the Pueblo occupation of southern Nevada had not been brought out, and the region might have remained in archeological darkness indefinitely had it not been for the efforts, in 1924, of Colonel James G. Scrugham, at that time Governor of Nevada. Governor Scrugham had read the Smith and the Morgan reports and had instructed his prospector friends in the southern part of the State to be on the watch for salt caves and extensive ruins.

It was Mr. John Perkins of St. Thomas and his brother Fay of Overton who finally reported both. I was exploring the Lovelock Cave in the northern part of the State at the time, and when the Governor invited me to go down to the Moapa Valley with him to inspect the new finds I gladly accepted.

This finally led to the intensive study of archeology of Southern Nevada which continued two seasons for the Museum of the

12. Kidder, A. V., "An Introduction to the Study of Southwestern Archeology," published for the Department of Archeology, Phillips Academy, Andover, Mass.; New Haven, 1924, pp. 37, 80.

American Indian in New York in co-operation with the State of Nevada and which has now been resumed for the Southwest Museum of Los Angeles.

The work for the Museum of the American Indian, concerned mainly with the exploration of Pueblo Grande de Nevada, popularly called the "Lost City,"¹³ and of the salt mines already referred to, together with a reconnaissance to determine the western boundary of Pueblo culture,¹⁴ has been published in preliminary form only.

It is planned to publish complete reports of the Southwest Museum's explorations now in progress. They will appear from time to time as the work continues, the present papers being the first of the Nevada series.

ARCHEOLOGICAL TERMS AND CONDITIONS

Before proceeding to our reports, it will be necessary to explain in advance that the remains we found in the Moapa Valley were plainly not all left by a single tribe, but by several Indian peoples, in various stages of development, who had successively occupied the oasis during the course of many centuries.

These peoples we have been able to identify, provisionally at least, by comparing the pottery and other articles they left behind them with those found by archeologists working farther east, particularly in northern Arizona, where the different stages of man's development, and the relative age of each have been worked out in considerable detail. For a summary of this the reader is referred to Kidder's standard work.¹⁵ In the present paper however, instead of using his system of naming the different peoples and stages of development, we are employing the numbering of the successive stages as suggested at the archeological conference held at Pecos, New Mexico, in 1927.

For the sake of convenience it may be well to explain this system in outline as applied to the whole Southwest, and to discuss the application of each period or stage to our local problem. This will serve the double purpose of defining the more or less technical terms we are obliged to use, and of summing up in brief the fund of knowledge we had to work with in beginning our survey. I say "knowledge," but a word of warning is necessary. While it is true that the things mentioned were actually found in the Moapa Valley, our explanation of their presence there, our assignment of them to

13. Harrington, M. R., "A Primitive Pueblo City in Nevada," *American Anthropologist*, Vol. 29, No. 3, July-Sept., 1927, pp. 262-277.

14. *Ibid.*, "Tracing the Pueblo Boundary in Nevada," *Indian Notes*, Vol. V., No. 2, Museum of the American Indian, Heye Foundation, New York, April, 1928, pp. 235-240.

15. Kidder, *op. cit.*, p. 188.

this period or that, is more or less provisional and subject to revision in response to new discoveries as the explorations continue.

By "Southwest" we mean the district covered by Arizona and New Mexico, plus adjacent territory in neighboring states, roughly constituting the early Pueblo domain; but it should be explained here that Dr. Kidder's system does not apply so well to the part of Southern Arizona once occupied by a civilization distinct in many ways from that developed by our "classic" Pueblos. It has been called the "Casa Grande Culture" after its most distinctive ruin, Casa Grande, near Florence, Arizona.

THE BASKET MAKERS

So far as known today the first people in the Southwest to take up agriculture and thus set foot upon the path of civilization were the mysterious, long-headed group known to archeologists as the Basket Makers, who seem to have flourished about 1500 B.C.; that is, in the Northern Arizona district. Of their first or non-agricultural stage, called Basket Maker 1 (Early Basket Maker), we know little; but with the second stage, Basket Maker 2 (Basket Maker proper), we are quite familiar. These people practiced agriculture, wove fine baskets and cloth bags, but made no pottery worthy of the name, and hunted with darts hurled with a curious contraption known as the dart-thrower or atlatl, being ignorant of the bow and arrow.

Fortunately for archeologists these people had the custom of burying their dead and storing their belongings in caves so dry that specimens of practically everything they owned, even highly perishable articles made of fur and feathers, have come down to us in a remarkable state of preservation. They lived to some extent in these storage caves and also outside, probably in shelters roofed with perishable materials, some of which at least were doubtless the semi-subterranean circular or oval dugouts known as "pit-dwellings."

We find a few scattered specimens, in or near the Moapa Valley, which seem to have belonged to one or the other of these first two Basket Maker stages. These are for the most part flint points for darts picked up from the surface (Fig. 6a) and occasional typical wooden objects from the dry caves, but as yet there is nothing to tell whether these represent Basket Maker 1, Basket Maker 2, or both.

There is one stage of Basket Maker development, however, which is very well represented in the Moapa Valley, and that is its third and final phase, called by archeologists Basket Maker 3 (Post-Basket Maker). In this stage we find agriculture, baskets, the pit-dwelling and the elongated skull; but the dart-thrower or atlatl had given way to the bow and arrow, and the people had learned how to make pottery.

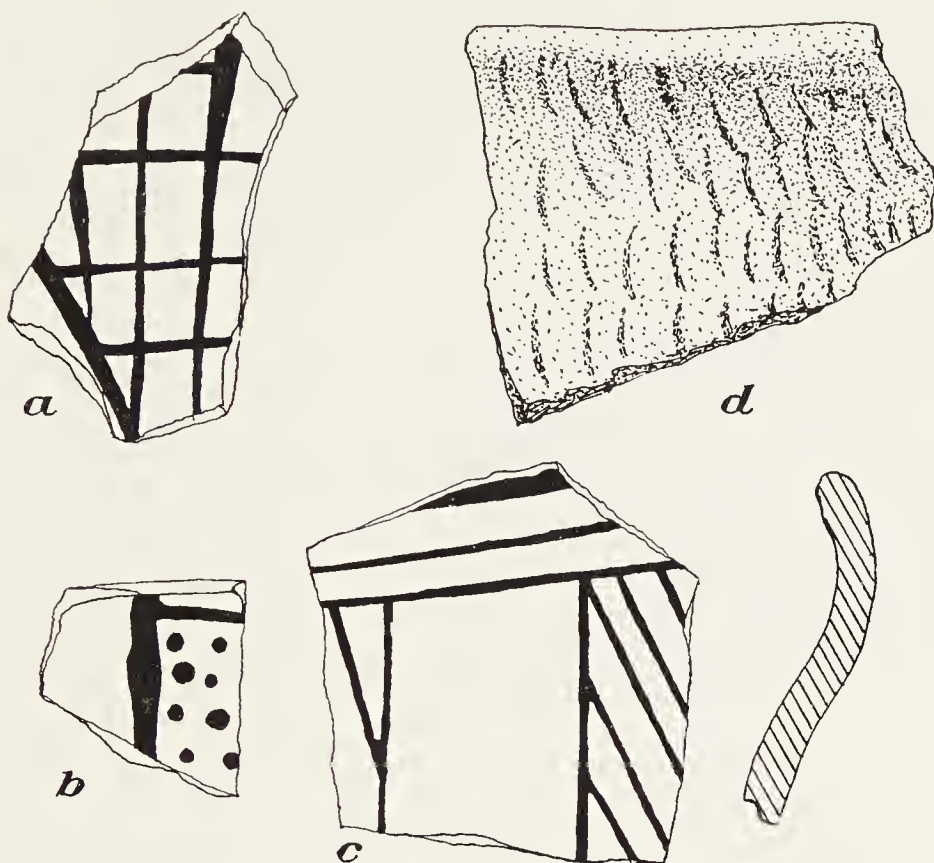


Fig. 3. Early and Late pottery decorations. (a) Basket Maker 3, Site 4, L. 50 mm. (b) Basket Maker 3, Site 14, L. 27 mm. (c) Possibly Basket Maker 3, Site 52A, L. 45 mm. (d) Paiute, view and section, Site 48, L. 54 mm.

Basket Maker 3 pottery in the Moapa Valley falls into two principal types, so far as we know, although little work has been done on this stage of culture here. The more characteristic ware is thin, gray, and fairly hard, somewhat irregular as to thickness, without the fine outer coating known as "slip" often seen on later types. The gray surface is usually (but not always) dotted with black specks, which upon examination prove to be coarse granules of dark crystalline crushed rock mixed with clay as tempering material to prevent cracking. In many cases, however, each speck is itself the focus of a group of tiny radiating surface cracks. The presence of the specks suggests that the surface was not subjected to the careful "floating" or rubbing—while semi-plastic—with a wet smooth pebble, used by many tribes to submerge coarse granules and thus create a smooth surface. The broken edges are mainly quite straight and clear-cut, although a scaly crumbling edge is sometimes seen.

In the main the vessels take the form of bowls and graceful, nar-

row-necked water-jars or ollas. Some of the bowls are decorated on the inside with crude designs drawn in black, the lines being usually thin, uncertain, sketchy and rather faint (Fig. 3a, b) as compared with the bold black patterns used later. The second type of pottery is dark in color, rather coarse in tempering, and seems to have been used mainly for cooking pots. It is hardly distinguishable from the cooking pottery of the Pueblo 2 period that followed.

THE PUEBLOS

In northeastern Arizona and elsewhere in the Southwest remains have been found which are assigned to a stage of culture immediately following Basket Maker 3, called Pueblo 1 (Pre-Pueblo). This is very similar to the Basket Maker 3 except for a slight improvement in pottery, and probably the introduction of cotton; but it is taken out of the Basket Maker class altogether (although baskets were still made) and identified as the first phase of the great Pueblo civilization, on account of the fact that the skulls of these people were round, like those of the Pueblo, and not long, like those of the Basket Maker. Of this stage we have found no positive traces in the Moapa Valley with the exception of a few pottery specimens that have a Pueblo 1 look. Certainly this type was not well established here.

Of the following Pueblo stage (Pueblo 2) there are abundant traces in the Valley. These people learned to build substantial one-story houses, many of them entirely above-ground, and often containing a number of rooms. They were almost entirely dependent upon agriculture, and seem to have added cotton as a real staple to the maize, beans and squashes known in earlier days. The cotton was woven into substantial cloth, some of it quite fine in texture. In typical settlements the skulls were round in the main, and often flattened at the back from pressure against a hard cradle-board in infancy.

Pueblo 2 pottery was well developed in form and decoration. The typical decorated wares do not show on the surface the coarse tempering granules seen in the pottery of the Basket Maker 3 stage, and there is often a white coating or slip covering the paste of which the vessel was made, a slip which makes a pleasing white background for the black patterns, often executed with skill and precision. This is called "Black-on-white" ware, and this name is applied also to unslipped gray or whitish wares with black decoration. There was also a fine red ware with decoration in black, called "black-on-red," and an unslipped type of pottery known as "corrugated ware" on account of its ridged surface, produced by leaving the structural coils unsmoothed on the outside by way of decoration.

There are two types of this corrugated pottery: "straight-corrugated"

gated," in which the coils have been left smooth, and "embellished corrugated," in which the coils have been notched or waved with the finger-nail or some implement so as to produce a more decorative effect. The "straight-corrugated" type of decoration is thought to have been applied to cooking pots as early as the Pueblo 1 period, but at that time it was confined to the neck of the vessel. So much for the Pueblo 2 stage in general.

In the Moapa Valley, however, we find the Pueblo occupation subdivided into two minor periods, the first or earlier of which, strictly Pueblo 2, we have named the "Lost City" phase, because it is best exemplified by most of the houses as Pueblo Grande de Nevada, popularly known as the "Lost City."

This phase represents the Moapa Valley Pueblo culture at the height of its prosperity,—a time when people built scattered small houses, including not only small oval pit-dwellings, smaller as a rule than those we attribute to the Basket Maker 3 people, but regular rectangular houses, mainly or entirely above-ground, of adobe laid in courses, or of adobe and stone, built singly or in groups or rows, sometimes in semi-circular form, but seldom arranged for defense. Many of the solidly built rooms were very small and were apparently intended mainly for storage of grain and other property.

In this "Lost City" stage we find abundant plain pottery of several types, some of them resembling Basket Maker 3 wares, especially the ollas; and abundance of black-on-white ware, usually taking the form of bowls, rarely jars, and, still more rarely, dipper. Much less common was black-on-red, and this also took for the most part the form of bowls, but there were also a number of the squat vessels with incurving rims which we distinguished as "gourd-shape," and an occasional handsome pitcher-like form. Typical vessels are shown in Fig. 4.

The percentage of corrugated pottery was small, some houses yielding none at all, yet both straight and embellished corrugated were represented. In some houses, apparently later ones, a few fragments of beautifully made corrugated bowls appeared, showing, on the inside, excellent black-on-white decoration.

The second period of the Pueblo occupation of the Lower Moapa Valley we have named the "Mesa House" stage because it is best exemplified by a ruin of that name, explored for the Southwest Museum in 1929, upon which a detailed report follows. It seems to form a connecting link between Pueblo 2 and Pueblo 3—which latter was the Great Period of Pueblo development.

This phase in the Moapa is marked by solidly built rooms, mainly for storage, arranged about a roughly circular or more rarely rectangular courtyard so as to form a defensive enclosure, with de-



Fig. 4. Pottery vessels, *Lost City Phase*

tached living rooms scattered about outside, the whole group being built sometimes on the summit of an easily defended mesa. The pottery is mainly corrugated, with a very small proportion of plain and painted wares,—black-on-white, black-on-red or black-and-white bowls corrugated outside. Some of the pottery is distinctly Pueblo 3. This Mesa House phase seems to have marked the end of the Pueblo occupation of the Lower Moapa Valley. A group of typical vessels is shown in Fig. 5.

The persistence of Basket Maker 3 types of pottery into the first phase (Pueblo 2) has been mentioned. I should like to add that the resemblance is more in paste than in decoration, and that the ware itself continued in greatly reduced quantity into the second phase, a few sherds being found in the Mesa House itself. The metates or grinding slabs, with the manos or hand-stones used with them to convert corn into meal, seem to be practically the same in the Moapa Valley for the Basket Maker 3, and both phases of the Early Pueblo. This type is shown in Fig. 7b, found at Mesa House and is characterized by the fact that the rim encloses the grinding-hollow on three sides only, the fourth side being open. The mano or hand-stone used with these metates is typically long in proportion to its width, and thin and flat. The form of arrowhead also seems to be the same for Basket Maker 3 and both phases of our Moapa Valley Pueblo occupation (Fig. 6b). It is characterized by a narrow stem for attachment to the shaft, flanked on each side by a barb or shoulder. I say *seems*; to confirm the statement as well as to straighten out other knotty points more work on our Moapa Basket Maker 3 stage is urgently needed.

It has been mentioned that the characteristic Early Pueblo



Fig. 5. Pottery vessels, Mesa House Phase

skull is round in form. Such skulls *are* found connected with this stage in the Moapa Valley, but, strange to say, the long skulls of Basket Maker 3 continue side by side with them at least into the "Lost City" phase.

This mixture of traits suggests that the Pueblos of the Moapa were not a pure strain, but a combination of true Early Pueblos—probably immigrants from what is now Arizona—with the original Basket Maker 3 stock.

That our second or Mesa House phase of the Pueblo occupation of the Moapa lasted until the period known as Pueblo 3—Kidder's Great Period—had begun can not be doubted. But at this point the Pueblos abandoned the Valley and we find no farther trace of them here, nor of the great cliff-dwellings and huge communal dwellings that form the great achievements of the Pueblo 3 period in northern Arizona and New Mexico. Nor have any specimens representing Pueblo 4 (the Late Prehistoric Period) immediately preceding the Spanish conquest, nor Pueblo 5, the Historic Period, since that event, appeared in the Moapa so far as we know.

THE PAIUTE

We do find, however, that a people of a more primitive stage of civilization left abundant traces in the Valley *after* the Pueblos had disappeared, and this stage of Moapa pre-history we call the Paiute, because many of the specimens belonging to this phase check up with the known products of the Moapa band of Paiute found by the first white visitors in control of the Valley, and still lingering in its upper reaches.

Paiute camp-sites are marked, as a rule, by quantities of large pebbles crackled by fire, called "fire stones." The characteristic pottery was black or dark-brown as to color, coarse in tempering, without slip, irregular in surface and thickness, and usually quite crumbly in texture. Most of the vessels seem to have been more or

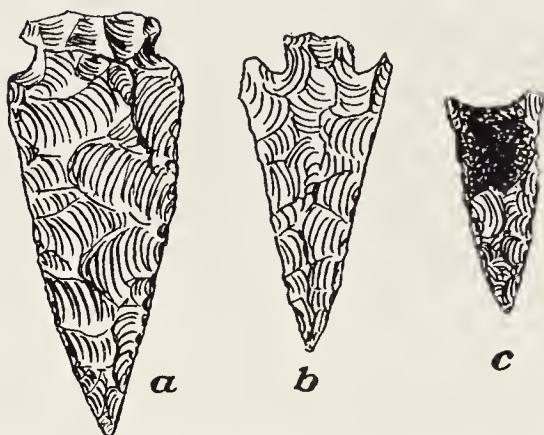


Fig. 6. Chipped flint points, Moapa Valley (a) Basket Maker dart-point, High Mesa near Mesa House, L. 47 mm. (b) Pueblo Arrow-point, Site 48, L. 35 mm. (c) Paiute Arrow-point, Site 48. L. 23 mm.

less conical in form, with pointed bottoms; and decoration, when present, consists of rows of thumb-nail imprints (Fig. 3d). The Paiute claim to have been manufacturing their characteristic pottery as late as the 'nineties of the last century. Paiute arrowheads are typically small, slender and triangular, without distinct stems or barbs (Fig. 6c); their metates narrow and traylike with an oval grinding-cavity entirely enclosed by the rim (Fig. 7a), not open at one end as in the Early Pueblo style; their manos are short and thick.

We have as yet found no traces of permanent dwellings on purely Paiute sites. The inference is that they built mainly, if not entirely, of poles covered with rushes, arrow-brush or other perishable materials.

OTHER REMAINS

There are traces of still another people in the Valley, in the form of pottery fragments which cannot be identified as Basket Maker 3, Early Pueblo, or Paiute—although the ware somewhat resembles the last mentioned, but is lighter in color, more sandy in texture, and smoother of surface. It is sometimes known as "red-on-buff" on account of the fact that decoration, when there is any, is made up of dull-red painted broad lines, sometimes

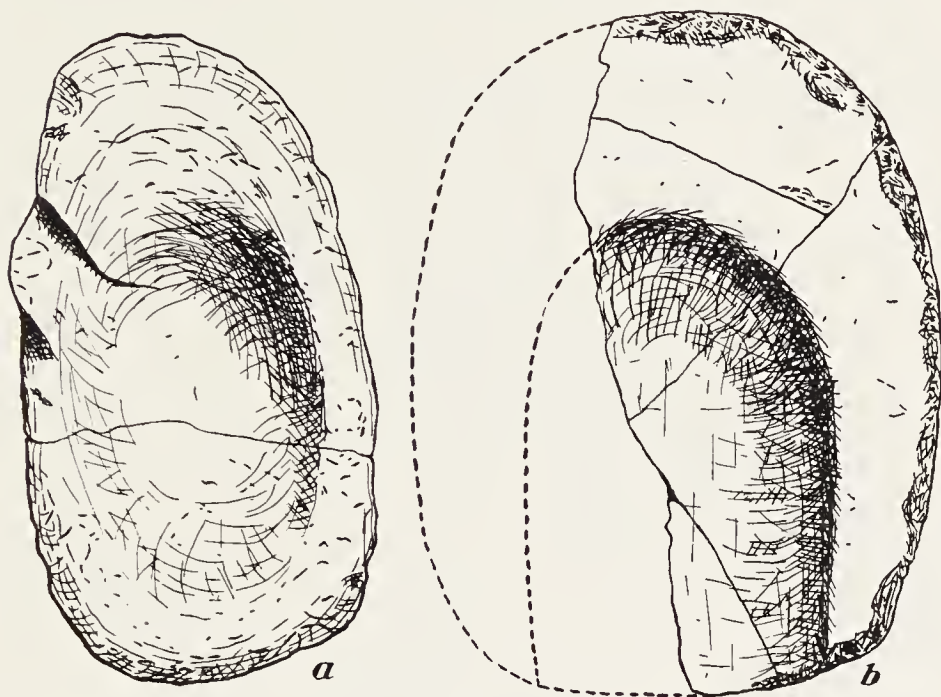


Fig. 7. Typical Metates, (a) Paiute type, $20\frac{1}{4}$ " x 11"; (b) Pueblo and probably Basketmaker 3 type, length 22".

curved, forming heavy crude patterns on the light brown or buff background. Because of its resemblance to the pottery made by the Mohave Indians on the Colorado River, it is sometimes spoken of as Colorado River or Mohave ware, although we are not positive that it was really made by that people. Neither are we sure of its place in Moapa Valley pre-history, but that some of it came in as early as the Mesa House phase of the Early Pueblo period is indicated by the finding of sherds of this ware in Mesa House itself.

CONCLUSION

Such, in brief, is our knowledge of Moapa Valley archaeology, so far as it goes. However it cannot be reiterated too often that the "knowledge" of today may be the discarded theory of tomorrow, and the Moapa Valley needs considerably more study before the mists can be swept away and the story of this western frontier of the ancient Pueblo civilization told clearly and beyond the shadow of doubt.

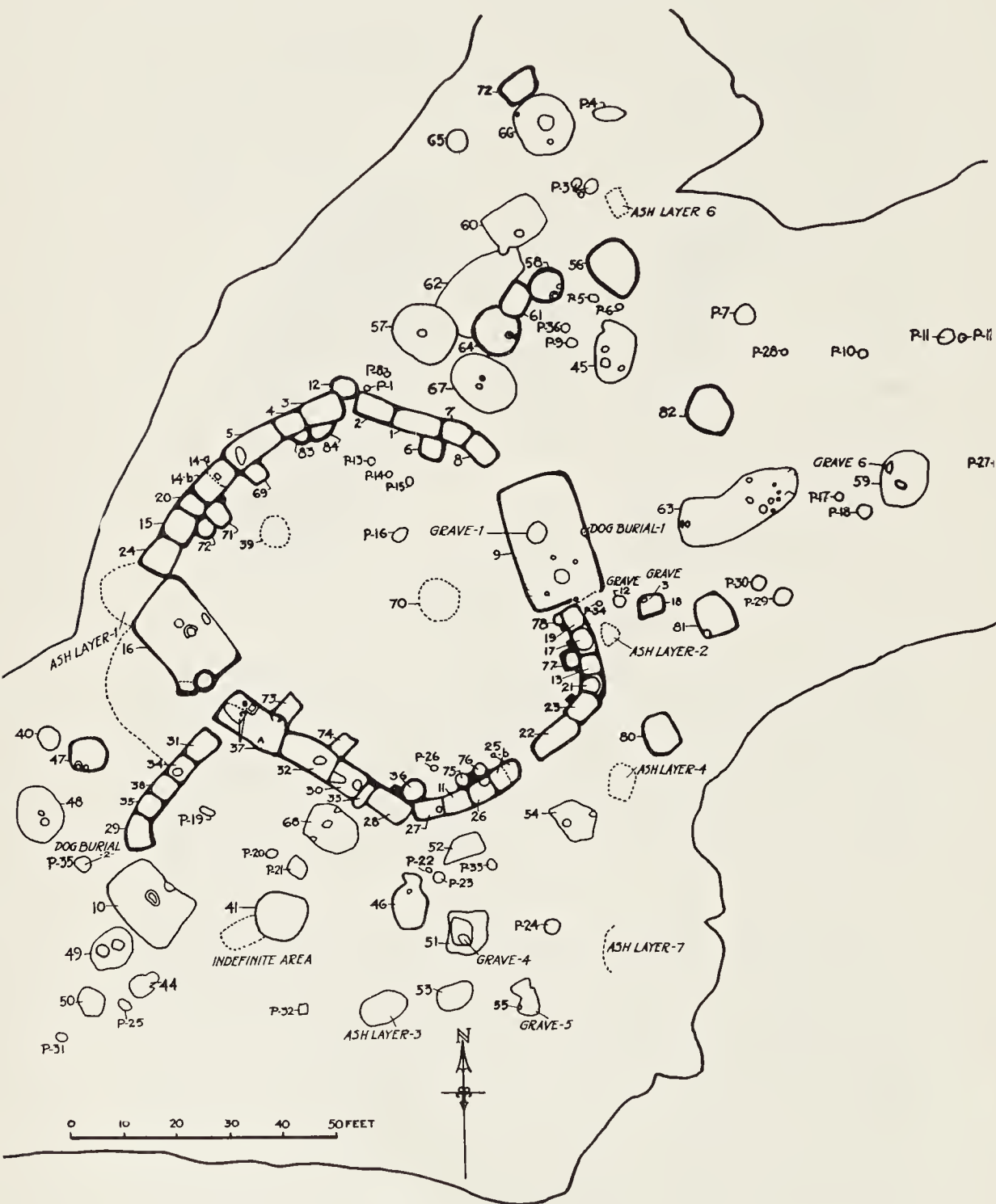


Fig. 1. Ground plan of Mesa House, Overton, Nevada.

MESA HOUSE

By Irwin Hayden

This report gives the results of the excavation by the Southwest Museum of a prehistoric Indian village site known as Mesa House, in southern Nevada. The type of houses and the specimens found on the site clearly show that the village was built and occupied by people whose culture was that of the Pueblos.

Southern Nevada is in the northern peripheral section of the area occupied by the Pueblos; an area generally spoken of by archaeologists as the Southwest. The village site therefore is representative of frontier conditions in that region.

Mesa House was completely and thoroughly excavated. Although small in extent, it possesses the quality of unity and may well have a greater significance than its size indicates. So far as can be seen the site contained no intrusive elements and was not superposed on any earlier dwellings. Seemingly the village was built and occupied by one group of people who lived in it for a brief time and went elsewhere; and since there is reason to believe that Mesa House was one of the very last of the Pueblo villages in the Moapa Valley it would be interesting to know where its people went after they abandoned it.

The field party left Los Angeles January 3, 1929, in charge of M. R. Harrington. The party included Mrs. M. R. Harrington, Irwin Hayden and his son Julian D. Hayden, Mrs. Bertha Pallan, a niece of the Harringtons and her daughter "Billie," a four-year-old who was a valued member of the group. At Las Vegas, Nevada, we were joined by James G. Scrugham Jr., son of ex-governor James G. Scrugham of Nevada, who has done much to further archaeological research in his state. The personnel was unchanged throughout the term of the expedition, which came to a close on April 10, 1929.

Having arrived in the Moapa Valley on the evening of January 4, we were met by Mr. Fay Perkins of Overton, Nevada, and were guided by him to a camp-site near Tokio Siding, where we set up field headquarters and camped during the entire period. Monday morning, January 6, found us ready for work.

The main object of the expedition was to make a general reconnaissance of southern Nevada and vicinity, especially the lower valley of the Muddy River, from its junction with the Virgin River, just below St. Thomas, to the point where the Weiser Ridge pinches the valley at the "Narrows," below Glendale.

A secondary purpose of the expedition was the excavation in whole or in part of any site or sites which by reason of their importance might require or justify immediate attention.

Such a site was already known to Mr. Harrington as a result

of his previous work in the Valley, at Lost City, or, as it is more formally known, Pueblo Grande de Nevada.

This chosen site was a ruin situated on a mesa some 8 miles northwest of Lost City and across the river from it. Harrington first learned of it in 1925 when a scouting party led by Mr. Louis Schellbach III, examined it and dug certain test trenches.¹ The results were such that Harrington determined to explore the ruin at the first opportunity. It was Schellbach who named it "Mesa House."

Accordingly, on the morning of January 6, Harrington instructed the writer to commence the excavation. Before describing the ruin and its immediate location, some mention of the Valley itself will be of interest.

The Moapa Valley,² so much of which can be seen from the Mesa House, lies in the midst of an arid, desert section of southern Nevada. In cross section the valley consists of an inner, recent trench, in an old flood-plain with a number of terraces bordering the sides. South of the "Narrows," at which point the Weiser Ridge pinches the valley into upper and lower sections, the greatest width between the Overton Ridge and the edge of the Mormon Mesa is about 6 miles. Above the "Narrows" the terraces merge with those of Meadow Valley and the California Wash, covering a wide expanse.

The old stream-cut valley ranges in width from a few hundred feet to 2 miles and has an average width of nearly a mile, south of the "Narrows." Its borders reach the clay of the terraces in ragged lines, the plain jutting back in the form of coves between the headlands of the higher ground. The surface is comparatively even but its regularity is broken by washes cutting through to the main stream, by abandoned channels of the river itself and by heaps of wind-blown sand. There is a gradual rise toward the high ground due to wash from the valley sides.

The present stream-bed is deeply incised through most of its length. Old settlers state that most of the cutting has been done since 1880, starting at a time of unusual floods. Formerly the channel was of slight depth. Much of the bottomland was set in grass. At times of high water the stream overflowed its banks and spread over much of the flood-plain. It is now confined between banks that are in most places vertical and from 10 to 40 feet high. The recency of the trenching is evident from the steepness of the loose silt banks and the absence of the effects of lateral cutting. The width of the channel barely accomodates the stream. This recent

1. (A report of this work will be found in the next following paper in this volume.—Ed.)

2. The writer is indebted to C. R. Longwell, *Geology of the Muddy Mountains, Nevada*, U. S. Geol. Surv. Bull. 798, 1928, p. 14 et seq. for nearly all of the data on physiography, climate and flora.

intrenchment of the stream is significant because of its connection with a general condition which is apparently affecting the entire area of the Southwest. It will be mentioned again in this report.

Climatic conditions in the Valley vary daily and seasonally, in the manner characteristic of the arid Southwest. Exceptionally hot days are followed by pleasantly cool nights, save in the hottest summer season. The delightful weather from October to May makes up for the intense heat which prevails from June to September. The air is clear and dry. This intensifies the effects of the sunshine but allows rapid radiation after sunset. The highest temperature recorded since 1907 is 117 degrees Fahrenheit. In the summer temperatures of 110 degrees Fahrenheit are common and during the season there are many days when there is almost no breeze; if one blows at all it is like the breath of a furnace.

Since 1907 the annual rainfall has been about 6 inches and the maximum about 9 inches. Most of the rain falls during thunder storms, the heaviest of which generally occur in July and August. Other rains may be expected in February and March and showers may occur in other months. General rains are rare. The most common storm is the local shower, which forms quickly and makes a sudden down-pour. Local areas frequently receive most of the annual rainfall in one or two cloudbursts. Snowfall is very rare. The mountains are sometimes whitened to their bases and at altitudes above 4000 feet snowbanks may lie for weeks.

During our stay in the Moapa Valley we experienced one heavy downpour of rain. We observed that almost immediate "puddling" of the dry surface soil took place. The driving rain flocculated the clay particles and formed a water-tight seal over the entire surface of the area affected, so that practically all of the water was shed into the smaller and larger channels and hence into the washes and finally the river. We noted that actual penetration of the soil by such a rain was negligible, in places not more than half an inch.

The nature and distribution of the rainfall had a particular bearing on our work. Owing to the fact that such rain as falls is at once dissipated in the form of "run-off," with no essential penetration into the soil, the objects which lay beneath the mounds had not been affected by moisture. Furthermore, we observed that except where cloudbursts cause local floods, there is practically no erosion of the land surfaces save where the river is deepening its channel.

The chief erosion agency in the valley is the wind. Strong gales heavily charged with cutting sands sweep the land surfaces, scouring the mesas and their windward sides very effectively.

The same winds which buried parts of Lost City under great dunes of shifting sand very nearly swept all traces of Mesa House

from the table land on which it was built. The limited preservation of the Mesa House is due entirely to the formation of a protecting litter of boulders which were used in the building of the stone-and-adobe walls of the houses. This litter of boulders was formed and protected the mounds of fallen adobe in precisely the same manner in which the "desert pavement" is formed, which so effectively protects the mesas from being swept away by the winds. The upper layers of the mesa soil contain angular fragments of limestone, quartzite, flints, etc. The winds sweep over the surface of the mesas, carrying away sand and silt. The fragments of stone are too heavy to be carried away by the wind and therefore accumulate and eventually form a fairly tight shingle or pavement, which prevents further wind-erosion.

So little vegetal material was contained in the ruin of Mesa House that we could get no adequate idea of the flora of the valley during the Pueblo occupation. There is no reason to suspect that any material change has taken place since then.

Just as with the vegetal material, the animal remains found in the ruin give no great amount of information as to fauna. Such animal bones as were found were badly shattered and fragmentary and so barren of diagnostic features that we could not identify many of them. The mammalian bones were surely for the most part from ungulates or hoofed animals. One was the scapula of a mountain sheep. The desert tortoise was represented by fragments of its carapace. Bird-bones were noticeably rare.

The Mesa House was built on the top of a bifurcated headland, 120 feet above the valley floor, reaching out into the valley and forming the southeastern rim of a wide cove in the edge of Overton Mesa. The table-land is about 160 feet wide, where the ruin lies. Its surface is covered with small fragments of limestone and quartzite, sand-blasted, and in the case of the quartzite coated with "desert varnish," which is a dark, brown, somewhat iridescent discoloration of the exposed surfaces, caused by sunshine and moisture and their effect upon the chemical constituents of the rock. Here and there is a creosote bush and now and then a cactus. Otherwise the tableland is utterly barren.

The headland on which the ruin lies is about midway between the points where the 1250-foot and 1500-foot contour levels cross the valley floor.

To the north of the site is a broad cove, with the Mormon Peaks in the distance (Fig. 2). The open valley lies to the east with the high, level rim of the Mormon Mesa on the far side of the river and the Virgin Peaks beyond. The land rises to the west, to meet the ridges which form the east rim of the Valley of Fire. About 1000 feet south of the ruin is Signal Hill, which stands about 150



Fig. 2. Site of Mesa House (center of picture) looking across Moapa Valley to the Mormon Peaks.

feet above the mesa. From its summit may be seen the entire country to north, east and south, and to the west for several miles. There were remains of fire-pits on the top of the hill. It must have been an ideal place for lookouts.

When we came to examine the ruin, we found that it had the appearance of a broad, low-lying mound surrounding a roughly rectangular courtyard. At the southwest side of the court was a mound of similar appearance and cross-section which proved to be a chain of rooms constituting a wing. Scattered over the mesa outside of the main group were isolated mounds. All of these were low, none of them over 2 feet high and the widest not more than 15 feet in breadth.

The mound enclosing the main courtyard consisted of adobe in which were included boulders of varying sizes. Over this was a litter of loose boulders, running in size from that of the fist to that of a man's head or larger. None of them showed signs of having been shaped or dressed. They were for the most part limestone and quartzite with some sandstone. The coarse gravel which makes up the topmost stratum of the mesa contains an abundance of such stones.

It became evident that by clearing away all of the surface litter of boulders, leaving only those which were at all imbedded in the soil, we could in most cases trace the outlines of the walls of the rooms by the rows of boulders projecting from the surface.

We first excavated every part of the area where surface indications of rooms were found. We then employed a soil-auger, such as is used for obtaining samples of soil for analysis or for testing for soil moisture. With this tool we bored test-holes into the soil, covering the mesa with holes every two feet, checker-board fashion. This method, at Mesa House, proved a sure one for locating any and all disturbances in the soil. The tell-tale presence of ashes and charcoal in the cores brought up by the auger showed us the location of nearly every room and pit outside of the main ruin and the southwest wing.

Practice in the use of this tool taught us not only to attend to the "color" of the core but also to the "feel" of the tool as it bored its way into the earth, to the variations in the sound of the metal against the gravel and to the odor of the virgin soil as contrasted with that of earth which had been contaminated by humans or animals. Thus the auger proved an important implement. Prospecting by its aid was effective, economical; it saved time and labor and helped keep down the cost of the work.

When finally the excavation was complete, we set up our plane table and mapped the ground plan of the ruin, drawing the map to a scale of ten feet to the inch. This ground plan (page 26) clearly shows the general scheme of the village, with outlying rooms, storage pits and fire-pits. The heavy lines indicate rooms and bins which had walls or wall foundation of mud and stone. The units drawn with light lines yielded no evidence as to the character of the superstructure.

Inspection of the ground-plan shows a courtyard surrounded by a chain of storage rooms, including two large rooms or houses; at the southwest side is a wing consisting of a row of bins and a large room or house. To the northeast of the main group is a cluster of rooms numbered 57, 62, 60, 67, 64, 61 and 58. Scattered about the main group are single houses, bins and fire-pits.

Analysis of the chain of rooms surrounding the courtyard and of the wing at the southwest shows that these are really three separate sections, one headed by Room 9, one by Room 16 and one by Room 10. Extending in a clockwise direction from these large rooms are rows of storage-rooms.

Just what the meaning of these three sections is, is not clear. It is easy to suggest that each of the three rooms, 9, 10 and 16, was occupied by a family group and that the appended string of storage-rooms was used by the occupants of the large rooms. It might even be suggested that three separate clans occupied the three sections. A fourth and smaller family or clan may have occupied the northeast cluster. Rooms 79 and 66 may have been the beginning of another cluster.



Fig. 3. Site of Mesa House from Valley level.

The fact that the site is on a mesa standing 120 feet above the valley floor and that the rooms of the main group are placed about a central courtyard, makes it easy to suppose a deliberate defensive arrangement as a protection from raiding nomads. This suggestion is all the more plausible because the Pueblo and Basket Maker III sites in the Moapa are usually on low knolls or ridges between arroyos or washes and seem to have been selected with no thought of defense from enemies but rather with an eye for drainage. The villages on such locations are mainly made up of single houses or of small house clusters. There are, however, instances of apparently Basket Maker III villages on the high mesas of the west side of the valley and on the higher benchlands below the rim of the Mormon Mesa on the east. The location of Mesa House is decidedly in contrast with the general condition and the only plausible explanation for the retreat to the high mesa is for defense.

While it is perfectly plausible to see a motive for defense in the arrangement of two of the chains of rooms about the courtyard and while this was probably the chief motive, anyone who is familiar with climatic conditions on the mesa can well believe that protection from the fierce north winds of winter and from the scorching sun of summer, were at least sub-motives in the arrangement. On the other hand, those who argue for the defensive purpose will not overlook the hill to the south, with its ancient fire-pits on the top, an ideal place for sentinels.

There is no way of learning which of the three principal sections of the ruin was built first. Intrusive graves in Rooms 51 and 59 indicate that these rooms had been abandoned and filled with rubbish at the time the burials were made and they may have been two of the oldest rooms on the site; but they may equally well have been two of the newer rooms which had been abandoned before the site was left

as a whole. Even such slight evidence as exists in these intrusive burials is lacking in the rest of the site.

The minor antiquities were so evenly distributed over the site that they give no clue as to the relative age of the different parts of the ruin. We searched in vain for instances of stratification of artifacts which might be assigned to different cultures or to older or newer phases of the same culture.

There was no evidence found which indicates long occupation of Mesa House. On the contrary, conditions pointed to a brief stay there. The fact that the remains of only seven individuals were found on the site, is in itself an argument for brevity of occupation, assuming that all the dead were buried on the site, which of course is not proven. The quantity of potsherds and other objects does not indicate long habitation.

The number of rooms excavated totals 84. Many of these "rooms," especially the detached ones, might well have been called houses, for the detached ones certainly were houses, to all intents and purposes. We commenced our digging at Room 1 and numbered the units in the order of their excavation. Having begun to designate the units as "rooms" we kept it up. It seemed more convenient, since the site as a whole was named "Mesa House," to use the term "room" instead of "house."

In looking over the data contained in the ground-plan and our notes, we find that our so-called rooms fall into a number of different classifications. The first in importance would be dwellings. Because the site itself tells us little of the habits of its erstwhile occupants, in regard to use of rooms or houses for sleeping quarters, we may perhaps be permitted to assign domestic use to some at least of the units which possess fire-places. We think that Rooms 45, 48, 49, 57, 60, 63, 66, 67 and 68 were dwellings. All of these rooms have one or more fire-places. None of them were, apparently, possessed of even quasi-masonry walls. We do not know how they were sided-in; we can guess, with some supporting evidence, that some of them had roofs of thatch and adobe, although how the roofs were supported we cannot say. Where post-holes were found of course we can readily assume posts; but post-holes were rarely found.

Three of the detached units, which showed evidence of masonry walls, were equipped with rimmed fire-places. Each of the three was partially underground. Were they dwellings? Two of them, Rooms 58 and 64, are associated with the cluster of rooms northeast of the main group. One of them, Room 47, is not far from Room 48, which we are quite sure was a house or dwelling. We are not ready to say that Rooms 47, 58 and 64 were ordinary houses. Knowing the bleakness of the location and having experienced the bitterness of the gales which sweep it from the north, we suspect that these three



Fig. 4. North and west row of rooms, showing wall construction. Room 5 in left foreground, Room 16 in center background.

rooms were very snug places during cold weather and may have been used for sleeping quarters during such times. The same may have been true of Rooms 56, 80, 81, and 82, all of which were detached units; but these had no fire-places.

Examining the units in the chains enclosing the courtyard and comprising the southwest wing, we find fire-places in only two of the smaller units, Rooms 15 and 37. The fire-place in Room 15 was a slab of stone in the southeast corner, raised above the floor, apparently a sort of primitive stove, possibly used for the making of "paper-bread."

The fire-place in Room 37, was rimmed but it seemed more like an oven. Its bottom rested on the floor of the room, whereas excepting in the case of the large rimmed oven in Room 16 and the smaller one in Room 63, all of the fire-places, rimmed or rimless, were basin-like depressions in the floors of the rooms. If the presence of a fire-place indicates a house, then, in the three chains of rooms, Rooms 9, 10, 16, 15, and 37 are the only units which can be designated as houses. The larger of the other connected units might, in inclement weather, have been used as sleeping quarters. The other smaller units were undoubtedly storage places.

Thus we have eleven detached units which seem surely to have been houses, three detached units which may have been houses, and

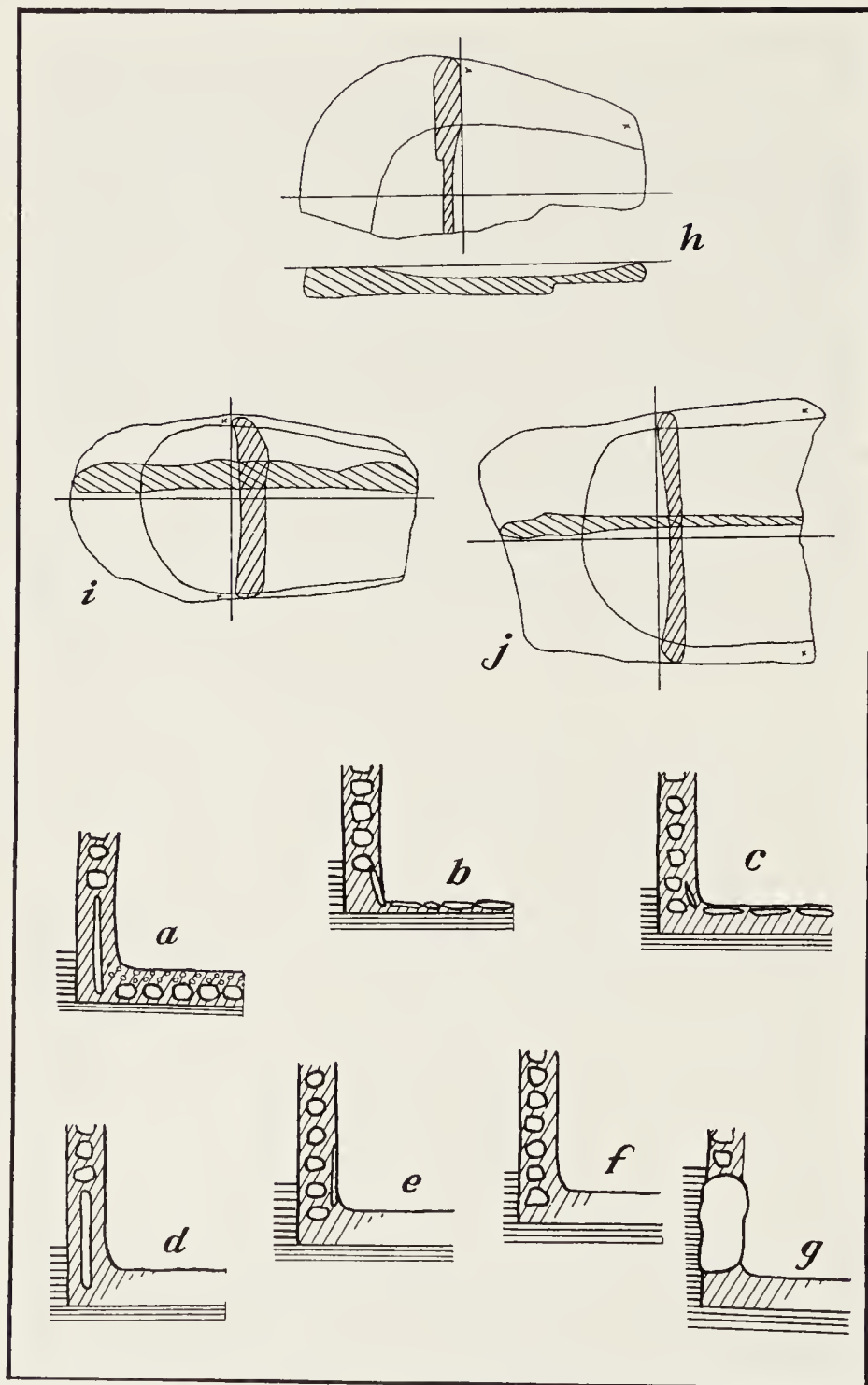


Fig. 5. Metates with cross sections and diagrammatic sections of floors (*a*, *b*, *c*) and of walls (*d*, *e*, *f*, *g*).

five units in the chains of rooms which may have been houses. This makes a total of eighteen houses.

If five people are allowed to a family, which seems ample, this would give Mesa House an estimated population of ninety souls, if all of the houses were occupied at the same time. The actual number living there at one time could not, in the writer's opinion, have much exceeded ninety; and the probability is that there were less than that at any given time.

The description of the eighty-four rooms excavated is given below. Dimensions, thickness of walls, type of floor and depth of floors below ground level, etc., are given in Table 1 at the end of this report.

When it is remembered that only the lower portions of the walls were found standing, it will be clear that very little could be learned as to wall construction, except in regard to their bases. In Figs. 5d, e, f, and g, diagrammatic sketches of cross-sections of walls actually observed are shown; and in the table of dimensions (Table 1) under the heading "Character of Base of Walls," the type of wall found is indicated.

Fig. 5d is wall-type 1 characterized by a sandstone slab set on edge in the base of the wall. Fig. 5e is wall-type 2, with a sandstone slab used as a baseboard, being flush with the plastering. Fig. 5f is wall-type 3, with rows of boulders and layers of adobe alternating, from the very bottom of the wall up. Fig. 5g is wall-type 4, in which a large boulder is set in the base of the wall.

Figures 5a, b, and c show diagrammatic sketches of floors actually observed. These floor-types are referred to by number under the heading "Type of Floor."

In Fig. 5a is shown floor-type 1. In this floor a rubble of larger stones is laid, covered over with gravel and surfaced with adobe. Floor-type 2, Fig. 5b, is a floor surfaced with sandstone slabs, with no other covering. In Fig. 5c is shown floor-type 3, in which the sandstone slabs are covered with a surface coat of adobe.

Material for walls, such as boulders, adobe and sandstone slabs, was immediately available. The upper stratum of the mesa contained an abundance of boulders of the sort used. Adobe could be obtained from nearby portions of the eroded mesa, where strata of clay were exposed. Strata of soft, easily worked sandstone, were a part of the mesa itself and such pieces as were used in the walls and floors required merely to be picked up and carried to the site.

Water for mixing the adobe possibly was the most tedious ingredient to obtain, from the standpoint of effort. We do not know how far these people had to go to water and there is no way to find out; but it is reasonably certain that the river was within a mile of the site.

Room 1. *An ash-layer was in the west end. Contents: 3 arrowpoints, 1 bone awl, 1 bone gaming piece, 1 fragment of a chipped blade, 1 potter's scraping and smoothing tool and 29 potsherds.

Room 2. The floor was covered by a thin layer of red sand, apparently wind-blown. Contents: a few potsherds.

Room 3. The east end of this room and the west end of Room 2 were separated by a space about 3 feet wide. The meaning of this is not clear. As shown on the ground plan, the north end of the space is blocked by Room 12. No conclusion was formed about this because someone had sunk a testhole just between the ends of Rooms 2 and 3 and had caused such a disturbance that nothing could be determined. This space may have been a fourth entry way, eventually closed by the storage room, 12; but it may itself have been a storage-place, for there was a suspicion of a floor and a south wall. Contents: 1 arrowpoint, 2 bone awls, a few pieces of animal bones and 49 potsherds. On the south side was a small storage bin or room, numbered 84.

Room 4. On the outside of the south wall was a storage bin, numbered 83. Contents: lumps of magnesite, 1 mano, 1 chipped flint blade, 51 potsherds, fragments of animal bones.

Room 5. The base of the south wall plainly showed the alternating layers of natural stone and adobe, characteristic of the quasmasonry of Mesa House. In the base of the west wall sandstone slabs were set on edge, another characteristic feature. There were several breaks in the floor, exploration of which yielded no data. Contents: 2 arrowpoints, 1 broken chipped blade, flint chips, pieces of turtle shell.

Room 6. Only the lower 6 inches of the wall of this small storage room remained standing, built on the south side of Rooms 1 and 7. The soil which filled it was loose in texture. As in Room 1, the absence of adobe and rock was noticeable. Contents: no artifacts.

Room 7. There was a noticeable absence of wall debris. In the southeast corner was a lump of adobe bearing the imprint of cornhusks and a stone, whose coating of mud showed similar imprints.

Room 8. The soil filling this room was light and loose; the only contents were a chipped flint knife, a fragment of a chipped blade, 3 potsherds and 1 small piece of animal bone. Room 1, 2, 6, 7 and 8 seem to have been of lighter construction than the rest of the rooms in the chain which for the most part were filled with tough, heavy adobe and rock. The west end of Room 2 was filled with such heavy material; but its eastern portion and the rooms east of it, to the

(*The location of the rooms described on this and following pages is seen in the ground plan, page 26. Size of room and data on construction are given in Table 1 at the end of the report.—Ed.)

5-foot passageway between Rooms 8 and 9 were filled with light, loose soil.

Room 9. This was the largest of the rooms. The mound covering it had been trenched by other investigators, and the disturbance made it impossible for us to get complete and accurate data. Like most of the rooms, it lay buried beneath the debris of its walls and roof. The floor was from 10 to 16 inches below the mesa surface and sloped toward the middle of the room. Four postholes were found in the south end of the room, grouped about a shallow fireplace. This would indicate roof-support, if the posts reached the roof. The entire floor, with the exception of the northern end, for a space of about one-quarter of the entire space, was heavily covered with ashes and charcoal, apparently from the burned roof. Above the ashes were potsherds, in the adobe which covered all.

At a point in the east side of Room 9, eleven feet from the southeast corner, was a dog burial. A shallow niche had been made in the wall and a grave dug to a depth of 3 inches. In this lay the skeleton of a dog, in a sleeping posture, with its nose on its front paws. The grave was capped with adobe. The earth surrounding the bones contained ashes and charcoal. The most significant feature of Room 9 was the human burial in its floor. This grave was excavated in 1926, under the direction of Mr. Louis Shellbach III, for M. R. Harrington. The trenching of the room was also done by Mr. Shellbach. His report on the grave and on the room as he found it is given in the next following paper in this volume. We re-opened the grave and found one entire turquoise pendant and parts of two others, overlooked by the previous workers. We also found the child's bones, left by the others, and we in turn reburied them. Contents of the room, found by our party: 1 potter's tool, for scraping and smoothing, 1 baked clay object, apparently a figurine, 1 piece of a small stone disc or gaming piece, a section of a wooden post, several pieces of a loosely twisted belt made up of native twine, a few flint chips, a potter's polishing stone and 145 potsherds.

Room 10. At about the center of the floor was a beautiful example of a rimmed fire-place, oval in shape, about 22 inches long and 12 inches wide and about 2 inches deep, below the floor-level. The rim was of adobe, about 5 inches high and about 8 inches thick at the base. The basin was filled with ashes. To the northeast of this rimmed fire-place was a boulder, possibly a doorstep. The top of this step was 12 inches long and 12 inches wide. It was 10 inches high, its top being level with the top of the mesa. The inner sides of the bases of the walls of Room 10 were definite and plastered. In places they were not perpendicular but flared outward at least 5 inches from the vertical. At no part of the room was there any portion of the walls standing above the mesa surface. The heavy

ash deposits and thick layers of fragments of charred poles and arrow-cane indicate destruction by fire. Contents: 34 potsherds, 2 arrowpoints, 1 chipped flint blade resembling those used in the mescal-knives, a short piece of twisted yucca fibre, 1 shell bead, 1 rubbing stone and pieces of coiled basketry, carbonized.

Room 11. In the northwest corner was a layer of ashes one inch thick, containing charcoal. Contents: 1 arrowpoint, 1 mano, 1 potter's smoother and scraper and 31 potsherds.

Room 12. This was evidently a storage-place. Contents: 1 arrowhead, 1 flint chip, 3 potsherds.

Room 13. On the floor was one corrugated potsherd. A cross-section of the room, from east to west, showed the base of the east wall standing 5 inches high, while the remnant of the west wall stood 13 inches high.

Room 14. A mass of rock and adobe divided it into two sections. The eastern section we marked 14a and the western section 14b. In removing the rock and adobe we came upon a large, roughly rectangular boulder, standing on end, its base imbedded in cemented gravel. The bottom of the boulder was 14 inches below the surface. Beneath it was a sandstone slab, 13 inches wide, 14 inches long, its upper surface 20 inches below the surface of the mound. This slab was midway between the sides of the room, its west edge coinciding with the east side of 14b. Under the slab was an uneven mass of adobe, overlying a whitish layer. A smaller sandstone slab was beneath the north edge of the larger one. Exploration of 14a yielded evidence of a floor at a depth of 13 inches, at the east end. The floor had disappeared except in the corners. We followed traces of ashes and charcoal to a depth of 28 inches from the surface, which seemed to be the result of rodent burrowings. Section 14a contained 1 arrowhead and a few potsherds.

Section 14b was 29 inches deep, from the top of the mound. It was filled with stratified soil with charcoal scattered through it. This soil seemed to have been carried in by rains. The floor of this section was one of the finest examples of adobe floors found on the site. Unfortunately rain fell before we could photograph it. This section was undoubtedly a storage-bin. The sandstone slab at its east end was a step. The boulder had some connection with this step, we do not know just what. A similar step occurred in Room 37, associated with a deep storage-bin; it was accompanied by a similar boulder. In the northwest and southwest corners of 14b were vestiges of a floor which was about 18 inches below the surface. This floor had been dug through when the storage-bin was made. Section 14b contained a few potsherds.

Room 15. In the southeast corner was a slab of sandstone, 10 inches wide, 17 inches long, and 2 inches thick, set across the corner,

with a space between the edge of the slab and the angle of the corner. Beneath the slab were ashes. There was every indication that fires had been made under this stone and we assumed that it was a hearth, with the space between the slab and the angle formed by the meeting of the end and side of the room for a flue. It may have been used for the making of "paper" bread. Contents: 2 arrowpoints, a few flint chips and 18 potsherds.

Room 16. The bases of walls of stone and adobe remained. The floor was somewhat depressed below the mesa surface and sloped from the sides and ends toward the centre. A considerable layer of ashes covered almost the entire floor. There were no large fragments of roof or wall material in these ashes. If gutted by fire, as we suspect, combustion must have been quite complete. Near the centre was a rimmed fire-place, 2 feet in diameter. Its bottom was 3 inches below the floor level. The rim was of fire-hardened clay, 4 inches high and 4 inches thick. To the east of it, against the side of the room, was the inevitable boulder or door-step, 12 inches wide and 18 inches long. Between the boulder and the fire-place was a heap of small boulders, some of them showing the effects of heat and smoke. This rimmed fire-place was filled to over-flowing with clear pearl-gray ash of a peculiarly almost-fluid nature. There was no charcoal in it and it did not have the appearance of ordinary wood ash. About 18 inches northwest of the rimmed fire-place was a rim-less one, about 18 inches in diameter and 10 inches deep. Its basin-like cavity was filled with ashes and charcoal. These fire-places lay beneath a bed of ashes 5 inches thick.

At the south end of the room, built into the wall, was a circular oven (Fig. 4) 30 inches in diameter, with sides of adobe, 6 inches thick and 16 inches high, above the floor. The bottom of the oven was the floor of the room. If there was originally a covering over the top of it, no trace remained. The oven-hole was filled with ashes and charcoal. On the west side of it was a ridge of adobe, about 4 inches high, extending to the west side of the room. This was perhaps a partition forming a corner-cupboard or bin.

The floor of the room was in good condition and was made of adobe, carefully laid and smoothed. At the sides occurred the usual up-curve, to meet the plastered walls.

The east side of the room was mesa soil; the north end showed a wall-base of rock and adobe. The south end of the room was of rock and adobe, which had been plastered with about 6 inches of clear mud, the inside surface of which had been carefully smoothed. Between the large oven and the east side was the best-built section of wall in the room.

Unfortunately a large test-hole had been dug through the mound covering this room, just northwest of the fireplace. A large sand-stone "hatch-cover" 16 inches wide, 20 inches long, lay on the edge

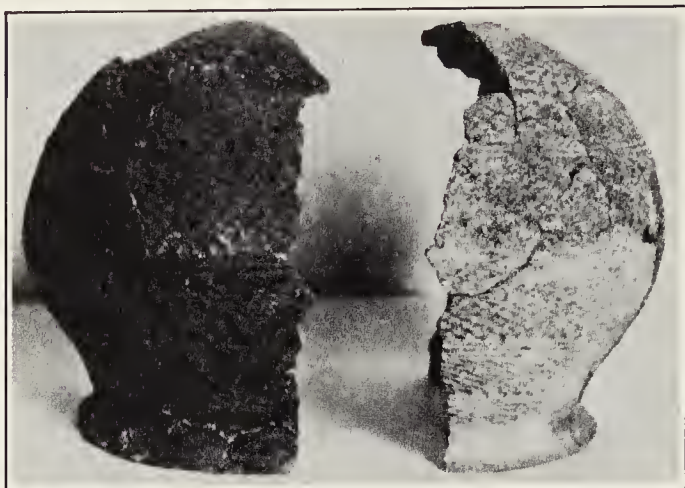


Fig. 6. The Divided Pot; half was found in Room 21 and half with a burial in Room 59.

of the test-hole. We do not know the connection between the slab and the room.

Contents: 1 obsidian arrowpoint, 1 chipped blade, 3 flint chips, 1 small piece of animal bone and 46 potsherds.

Room 17. In the floor was a roughly circular pit, 12 inches deep, plastered with adobe. Its diameters were 36 and 47 inches. Contents: 1 flint chip and 47 potsherds.

Room 18. All that was left of this room was its floor, and the lower edges of the sandstone slabs which were built into the wall-bases. On the north side the floor was right at the surface of the mesa. Four inches of the south wall still remained standing. On uncovering this floor we came upon what at first seemed to be the remains of a large egg-shell, in a cist in the northwest corner. It proved to be the skull of an infant. The cist was marked Grave 3. Room 18 contained 1 arrowpoint and 3 potsherds.

Room 19. The carapace of a tortoise, found here, contained red paint. Other contents of the room: Lumps of magnesite, a few animal bones and 31 potsherds.

Room 20. Contents: 1 potter's polishing stone, 1 arrowpoint, a few lumps of magnesite, 2 flint chips and a few potsherds.

Room 21. Sandstone "base-boards" were used in the south and west walls. The half of a large corrugated cooking pot (Fig. 6) lay on its side, its top 6 inches below the surface and its bottom 16 inches deep. The other half of this pot was found in Grave 6, Room 59. The only trace of a floor was in the northeast and the southeast corners, 2 inches deep; although the bottom of the room was from 12 to 19 inches below the surface of the mesa. A rim of clay and stones, 3 inches from the bottom and 3 inches from the wall, on the north

side of the room was noted. Contents: 19 potsherds and the fragment of the large cooking-pot.

Room 22. Contents: Lumps of adobe, with imprints of reeds, on the sides next to the floor; and 22 potsherds.

Room 23. The base of an adobe buttress stood against the outside of the northwest wall. Contents: 1 arrowpoint, 1 bone gaming piece, 1 fragment of metate and bits of animal bone; also the skull of a small carnivorous animal.

Room 24. Contents: A few potsherds and flint chips.

Room 25. A partition about 6 inches high divided this room into two sections. The partition was of adobe, with no stones in it. In 25b was a heap of sandstone blocks, about 6 inches across. One of them had a rounded edge. One piece had a hole in it, apparently drilled. Contents: 4 potsherds.

Room 26. In the northeast corner was a pit, 8 inches deep, irregular in shape, 10 inches long and 5 inches wide.

Room 27. There were two breaks in the floor. One proved to be a circular depression, 1 inch deep, paved with stones. Its average diameter was 13 inches. The other was a storage pit, 14 inches deep, 16 inches in diameter, containing many corrugated potsherds. The floor was covered with ashes. Potsherds and pieces of charred wood were found at all depths in the debris of adobe and rock which filled the room. In the center, about 8 inches from the floor, was a heavy mass of ashes covering about 4 square feet. Contents: 1 fragment of a potter's scraper and smoother, 3 bone awls, 1 arrowpoint, 1 chipped drill point and 1 mano.

Room 28. The central portion of the floor was covered with a layer of ashes several inches thick. A mass of adobe in the west end showed imprints of reeds on the surface next to the floor. For a space of 19 inches the east end of the room had a floor of mesa soil, except for a small area near the west end. A semi-circular row of lumps of adobe apparently had formed a portion of the rim of a storage bin in the west end. Contents: 1 bone awl, in excellent condition.³

Room 29. The floor was of sandstone slabs, chinked with smaller stones. The shape of the room is interesting. A glance at the ground-plan shows it to be the terminal room of the southwest wing; it may be that the shapes of Rooms 29 and 10 were affected one by the other, when they were laid out. Contents: a few flint chips and 36 potsherds.

Room 30. A thin layer of ashes covered the floor. A pit, 21 by 28 inches in diameter, and 7 inches deep, and a smaller circular pit, 3 inches deep, were sunk in the floor. Both were unlined. A few potsherds were in the debris.

3. See Fig. 14 for bone implements found at Mesa House.—Ed.

Room 31. A thin ash layer covered the floor. In the debris of rock and adobe were a fragment of a mano and 32 potsherds.

Room 32. About one-half of the floor was covered with a layer of adobe, very thin. Beds of ashes were on this floor. The rest of the room had no definite floor. A pit, 20 inches deep, 3 feet wide and 4 feet long, in the east end, contained sand, charcoal, stones, fragments of adobe floor and pieces of sandstone, one of which had a rounded edge. A shallower depression, 8 inches deep, lay between the pit and the south wall. In it were sand, charcoal and a few traces of ashes. Contents: 2 arrowpoints, 1 fragment of an arrowpoint, a few animal bones and 17 potsherds.

Room 33. A ridge of adobe formed a small bin in the south end. Contents: 1 fragment of a rubbing stone and 17 potsherds.

Room 34. The floor was partially covered with ashes. A pit, 20 inches deep, 20 inches by 23 inches in diameter, was in the south end. Contents: 1 small stone disc, 1 flint chip and 8 potsherds.

Room 35. The floor was deeply covered with ashes. In them were 7 squash seeds. Other objects were 1 flint chip, 1 chipped drill-point and 44 potsherds.

Room 36. This room was circular, built in the inside angle formed by the meeting of the north walls of Rooms 27 and 28. A heavy buttress of adobe was built against the northwest side of 36. The room as we found it was 23 inches deep with an average diameter of 3 feet 7 inches. It was filled with a very hard adobe and stones. The walls were plastered with a brown clay, very tough and of a rubber-like consistency. Nothing like it was found in any other room. Potsherds 25 in number were scattered throughout the debris which filled it. About 2 inches above the centre of the floor was a small rectangular sandstone slab.

Room 37. This was separated from the large room to the north by a space of 3 feet. The floor-plan was irregular. The northeast side was not straight but curved outward and for much of its length was not vertical but sloped as much as 6 inches from the vertical at about its centre. The floor was a very good one, of smoothed and hardened adobe. At the southeast end was a pit, 18 inches deep and about 18 inches in diameter, unlined. It probably served as a storage pit. At the southeast end, next to the courtyard, was a rimmed fireplace, 12 inches in diameter, its bottom formed by the floor of the room. The rim was of adobe, 3 inches thick and 4 inches high.

Toward the northwest end of the room was a stone slab about 15 inches in diameter, 14 inches below the surface of the mound, about 5 inches below floor level, set in adobe. Standing on its end, at the northeast side of the slab but not set in adobe, was a sandstone boulder, about 14 inches long. This was the second instance of a boulder in association with a stone slab and a storage-bin. The slab was in a rectangular depression 15 inches long. The northwest edge of

the depression formed a part of the side of a large storage-bin, from 27 to 31 inches deep, measuring from the floor, in the northwest end of the room. This bin was plastered and floored with adobe, which had been applied with great skill and care. The sides of the pit flared out from the vertical, in places as much as 6 inches. At a distance of about 3 feet from the northeast side was a partition, dividing it into 2 bins. The base of the partition was from 5 to 7 inches high and 5 inches thick. It was made of stones heavily plastered with adobe. It stood about 8 inches high. The diameters of the pit were 3 feet 6 inches and 5 feet 6 inches. This was filled with stratified soil, sedimentary in nature, which had evidently been carried into the pit by rains.

On either side of the partition which divided the pit into 2 parts was a heap of potsherds, which proved to be from the same pot. When assembled they formed about one-half of a large corrugated cooking-pot. On the northeast side of the partition the sherds were concave side down; on the southwest side they were concave side up and several large stones lay in the hollow of the sherds. Besides this pottery were found 70 other sherds and 1 arrowpoint, in the debris filling the room.

Room 38. Contents: 1 fragment of a bone awl, a pick chipped from a water-worn quartzite boulder, and 94 potsherds.

Room 39. About 13 feet inside the northwest row of rooms was a circular mound of stones, approximately 8 feet in diameter. Excavation beneath this mound revealed only a maze of rodent burrows, filled with ashes and charcoal, with a few potsherds. The meaning of the mound was not apparent.

Room 40. A ring of stones, marked the site of a basin-like pit 4 feet 3 inches in diameter and 12 inches deep, whose sides were not vertical but flared so that while the diameter at the top was 51 inches, at the bottom it was only 32 inches. The ring of stones was about 8 feet in diameter. Contents: 3 potsherds.

Room 41. This room was indicated by a circular area 12 feet in diameter, littered with stones of the type used in walls, including several larger boulders. The bases of the walls were of mud, 10 to 12 inches thick. The floor was from 8 to 12 inches below the mesa level. The outline of the room was irregular. Along the east side, which was 5 feet 5 inches long, were 5 large boulders, averaging 10 by 12 by 7 inches in width, length and breadth. Smaller stones, averaging 4 by 7 by 5 inches, were used in the base of the side walls. Contents: 25 potsherds and 1 fragment of a chipped blade.

Room 42. This number was used to mark a mound which proved to be a part of Room 46.

Room 43. We mistook the southwest end of the passageway between Rooms 16 and 37 for a room and assigned this number to it.

Room 44. Gravel, containing a large number of potsherds and much ashes, filled this unlined pit, which was 28 inches deep. On the northwest side was an entrance-way or at least an inclined depression 2 feet wide and 3 feet long, cutting the side of the pit at a depth of 20 inches and level with the mesa-top at the end away from the pit. Contents: a few fragments of animal bones, including pieces of tortoise carapace; 1 flint chip, 1 fragment of a potter's polishing stone and 162 potsherds.

Room 45. All surface evidence had disappeared. Its outlines were marked by undisturbed soil. The floor was from 9 to 14 inches below the surface of the mesa and was somewhat smooth and hard but not made of adobe. Three fire-places, two of them 15 inches in diameter and one 2 feet in diameter, were in the floor. Two of them were 4 inches deep. The eastern-most one was 6 inches deep. Contents: 1 small stone disc, 6 flint chips, 1 fragment of a abrasive stone, 1 fragment of a potter's scraper and smoother, 1 fragment of a bone awl and 181 potsherds.

Room 46. The mound overlying this room was in 2 parts. The northern part was numbered Room 42 but proved to be a part of Room 46. The floor was of natural soil, 10 to 12 inches deep. The base of the walls was of boulders and adobe, 7 inches thick. The room was filled with adobe and stone. Most of the potsherds were found on the floor, on which were beds of ashes. The ground-plan of the room is bottle-shaped, with the neck of the bottle toward the north. This we marked 46a. In 46b were found 2 bone awls, 1 mano, 1 metate, 1 arrowpoint, 2 fragments of arrowpoints, 2 flint chips and 47 potsherds.

Room 47. The floor of adobe, well-made, lay 19 inches below the surface of the mesa. All traces of superstructure had disappeared. The sides were plastered to a height of 6 inches; above the plaster was rough adobe and stone. On the south side of the floor, its center 15 inches from the southwest corner, was a fine specimen of a rimmed fire-place (Fig. 7), 12 inches wide and 14 inches long. The rim, of adobe, was $2\frac{1}{2}$ inches high and about 5 inches thick at the base. The bottom, level with the top of the rim where it met the side of the room, sloped away toward the center of the room, to a depth of $2\frac{1}{2}$ inches below the floor level. In and around it were white ashes. East of it was the usual boulder door-step (Fig. 8). The debris in Room 47 was in 4 layers. We thought for a time that here we had a pottery sequence, for the bottom layer at one place seemed to carry a larger percentage of plain pottery than did the middle layer. Further excavation dispelled the idea of stratification, so far as pottery went. Contents: 3 arrowpoints, a few flint chips, 1 bone awl, 1 fragment of mano, fragments of animal bones and 96 potsherds.



Fig. 7. Corner of Room 47 showing fireplace and stepping stone.

Room 48. Here all evidence of superstructure had disappeared. The room was located by the soil-auger. The floor, of natural soil, was 6 inches below the surface: the depression was filled with a debris of adobe and charcoal. The surfaces of adobe next to the floor showed the impressions of reeds and contained fragments of charred poles, some of them $1\frac{1}{2}$ inches in diameter. The room seemed to have been destroyed by fire. We found no post-holes and have no data on which to base a conclusion as to the type of structure except that rock was absent from the debris and there were no traces of wall foundations.

The floor sloped up from a depth of 6 inches at the center of the room to within an inch or less of the surface of the ground. The room may have been an arbor, with a roof of mud and thatch, but we found no post-holes. Two fire-places were in the center of the room. They were about 15 inches in diameter and were 6 inches deep, below the floor. Contents: 1 fragment of a potter's scraper and smoother, 1 potter's polishing stone and a few potsherds.

Room 49. This lay to the southwest of Room 10 and near it but no trace appeared on the surface. Excavation showed a rather indefinite area, ranging in depth from 5 to 10 inches. In its middle part were two fire-places, both averaging 2 feet in diameter and both 6 inches deep, below the floor. There were no traces of sides or walls. Contents: a few fragments of animal bones, 2 flint chips,

49 potsherds and a large "blank" of chalcedony, roughed out for the making of a chipped blade.

Room 50. This room, without traces of superstructure, was floored with mesa gravel covered with a thin layer of sand, which had the appearance of having been baked by fire. There was no adobe in the debris and no stone; simply sand and gravel, mixed with charcoal and ashes. The floor was about 22 inches deep, below the ground-level. On all except the southeast side a set-back occurred, at a height of about 12 inches from the floor. In its broadest part this was 9 inches wide. Two small pits, 3 inches in diameter and 3 inches deep, were noted, near the south side of the room, which may have been post-holes. Contents: 3 fragments of potters' scrapers and smoothers, 2 manos, 1 metate, 1 abrading stone, 1 arrowpoint, 1 bone awl, a few fragments of animal bone and 46 potsherds.

The metate was found in the center of the floor, bottomside up; under it lay its mano. The other objects were some of them on the floor, some scattered through the debris.

Room 51. An intrusive burial had been made in here,⁴ having been dug through the rubbish which filled the room after its abandonment. The room was irregular in shape. Its sides sloped in from the level of the ground to the edge of the pit-like depression in its center. This edge was 7 inches below the surface of the ground. From it the sides dropped with a slight inward slope to a depth of 15 inches below ground-level. The floor of the pit inclined toward the center to a depth of 21 inches. Sides and floor were natural soil. The objects in the room were scattered throughout the debris. They were: 1 mano, in 2 pieces; 1 small stone disc, 3 arrowpoints, 2 fragments of arrowpoints, 1 lump of clay, mixed with quartz particles, evidently a lump of paste for pottery, unbaked; 2 fragments of a crude bowl and 391 potsherds.

Room 52. This was a depression, irregular in outline, 4 inches deep in the average, and filled with a debris consisting of layers of ashes and of soil containing ashes. No traces of structure, superficial or otherwise, were visible. Contents: 3 arrowpoints, 1 mano, 1 small stone disc, 1 rubbing-stone, 1 fragment of a hammer-stone, 10 flint chips, a few animal bones and 164 potsherds.

Room 53. Another depression, with irregular outline, from 4 to 6 inches deep with sides and floor of mesa gravel, this room was filled with a mixture of adobe and gravel. The floor was covered with an ash-layer. No data as to structure were present. Contents: 1 arrowpoint and a few potsherds.

Room 54. This room was a depression, with sides and floor of natural soil and irregular outline. The floor was covered with

4. Described on page 57. Illustrated in Fig. 10.—Ed.

ashes and the depression filled with adobe and gravel. Nothing was found to indicate the nature of its superstructure. In the east corner was a pit 12 inches in diameter, 6 inches deep, possibly for storage. Just west of the floor-center was a fire-place, 15 inches in diameter and 6 inches deep, below the floor surface, filled with charcoal and ashes. Contents: 1 arrowpoint, 2 flint chips, and 66 potsherds.

Room 55. This was a double pit, for storage, apparently. The bottom of the northwest section was 15 inches below ground level, the bottom of the other section, 25 inches. Both sides and floors were of natural soil. No trace of superstructure remained. The debris was of gravel, which contained the 2 flint chips and the 44 potsherds in this room. In the west side of the deeper part of the pit was a depression 4 inches deep, 6 to 9 inches in diameter, containing several bones from the skeleton of a very young infant.

Room 56. The floor, of natural soil, was 8 inches below the ground level. The sides were of adobe and stone, averaging 6 inches in thickness, apparently the bases of walls. A debris of adobe and stone covered the floor, which had over it a layer of ashes, under the debris. In the center of the floor was a bed of white ashes, 18 inches in diameter. Contents: 1 arrowpoint, 5 flint chips and 46 potsherds.

Room 57. This was one of a cluster of rooms northeast of the main ruins. Three of the rooms were apparently built with walls of mud and stone; these are marked 58, 61, and 64. The other three, Rooms 57, 62 and 60, contained no evidence as to their superstructure. Room 57 had a good adobe floor in the northwest quarter; otherwise the floor was of natural soil. The floor-depth was from 10 to 13 inches from the surface of the soil. The sides were of mesa gravel; 8 postholes were set in the angle formed by the meeting of floor and sides. These postholes were not vertical but were dug at an angle, so that if poles were set in them the tops of the poles would meet above the center of the floor. The diameter of the postholes was about 4 inches. For a distance of about 3 feet, except on the south side, a mass of adobe lay over the outer edges of the floor. This adobe showed evidence of having been in contact with fire and its under sides showed reed prints. A layer of ashes covered the entire floor. It is quite likely that this was an earth lodge. In the center of the floor was a fire-place, filled with charcoal and ashes, 18 inches in diameter, 4 inches deep, measuring from the floor-level. Contents: 8 arrowpoints, 1 bone awl, 1 small stone disc, 2 fragments of chipped blades, 2 flint chips, several charred mesquite pods of the "screw-bean" type, fragments of corn-cobs, charred, and a pendant in the form of a bird carved from the horn of a mountain-sheep (Fig. 13b). A few fragments of animal bones occurred. There were 165 potsherds. With the exception of

3 pieces of flint in the debris, everything was found on the floor.

Room 58. The adobe floor was 18 inches below the surface of the mesa. The sides still showed the bases of the walls, of adobe and stone, plastered, about 5 inches thick. In the southeast corner was a rimmed fire-place, the bottom of which rested on the floor. The rim, of adobe, was 6 inches high and about 4 inches thick. To the north of the fire-place, at a distance of 15 inches, was a boulder, its top 8 inches from the surface of the mesa. Contents: 1 small stone disc.

Room 59. The floor was from 14 to 20 inches below ground-level and was of adobe. The room was irregular in outline and no trace of superstructure remained. In the southern part of the floor-space was a fire-place 2 feet in diameter, containing ashes and charcoal: its bottom was 4 inches below the surface of the floor. In the west side near the wall, was an infant's grave, intrusive. It apparently had been dug after the room was filled with debris. About 2 feet northeast of this grave, lying on the floor was a small bird-pendant, of turquoise (Fig. 13g), which was the only turquoise object found by us at Mesa House, except the pendant and 2 fragments from grave 1 (Fig. 13a and c). Contents: 1 arrowpoint, 2 fragments of arrowpoints, 3 fragments of manos, 5 flint chips, a few pieces of animal bones, 156 potsherds and the turquoise charm. In a pocket on the east side, was a long bone awl, badly decayed. With the exception of the turquoise and this awl, the objects were scattered through the debris which filled the floor-space.

Room 60. All surface evidence had disappeared. The floor was 14 inches below the ground-level and was covered with a layer of ashes about 4 inches thick. The room was rectangular in outline. A little to the southwest of the center of the floor was a shallow fire-place, 3 inches deep, 18 inches long and 9 inches wide. In the southwest corner was a niche, in which, lying on its side, was a large corrugated cooking-pot, which was cracked and decayed. Its mouth was toward the side wall. Other contents of the wall were: 2 chipped blades, 3 flint chips, and 67 potsherds. These objects were scattered through the debris of gravel and charcoal, which filled the room.

Room 61. The stones in the adobe walls made a faint outline of this room, in the soil of the mesa. The floor was of adobe. Contents: 54 potsherds.

Room 62. Between Rooms 57 and 60 and northwest of Rooms 61 and 64 was an area floored with adobe, covered with gravel and ashes. The floor was about 8 inches below the mesa surface. No trace of superstructure was found. Contents: 1 arrowpoint, 11 flint chips, 1 fragment of a mano, a few pieces of animal bones and 181 potsherds.

Room 63. There was no sign of this room on the surface of the mesa. It was of irregular outline. At the east end was a rimmed fire-place, the bottom of which was 5 inches below floor-level. Two pits, one 18 and the other 20 inches deep, and 12 and 18 inches in diameter, unlined, were near the south side of the eastern part of the floor. These may have been storage pits. Northwest of these was a fire-place, 18 inches in diameter, its bottom about 5 inches below floor-level. Near the north side of the room was a flat stone, about 20 inches in diameter, its top 4 inches below the surface. Six vertical post-holes bordered the south side of the east half of the room. These were 5 to 6 inches deep. Their arrangement is shown in the ground plan.

The floor was of adobe, from 2 to 8 inches below ground-level in the east half but from 10 to 15 inches deep in the west half. The west portion of the floor was covered with ashes. Against the west side was a boulder, 13 inches high, 6 inches wide and 20 inches long. A flat stone, 12 inches wide and 18 inches long, lay east of this boulder, at a distance of about 10 inches. Its top was lower than that of the boulder by about 3 inches. The impression gained was that these were door-steps below an entrance way. Aside from the 6 postholes, no hint as to the nature of the sides or roof of the room was found. The floor was covered with adobe, with a few boulders. Contents: Fragments of 2 bone awls, 1 small hammer stone, 1 arrow-point, 1 bone gaming piece and 237 potsherds.

Room 64. The floor, of adobe, was from 9 to 13 inches below ground-level and was covered with a litter of boulders and adobe. There were no ashes on the floor. Near the east wall was a rimmed fire-place, its bottom about 4 inches below floor-level. It was oval in outline, 15 inches long, 10 inches wide. Its rim was 2 inches high and 3 inches thick, and made of adobe. Directly east of the fire-place was a boulder, 10 inches high, 10 inches wide and 15 inches long, set against and partly into the wall. It may have been a door-step. Contents: 1 bone awl, 2 fragments of arrowpoints, 8 flint chips and 64 potsherds.

Room 65. A shallow basin, circular in outline, near the edge of the mesa, it was 5 feet in diameter, with its floor 5 inches below ground-level in the center. There was no floor and no trace of walls. The depression was filled with adobe. A few ashes were on the bottom. Contents: 1 fragment of animal bone, 1 hammer stone, 8 potsherds.

Room 66. This lay southeast of Room 79 and adjoining it. The outline was irregular. The floor, of natural soil, was 7 inches below the ground level. There was no evidence as to the character of sides or roof. A mass of adobe covered the floor. Near the center was a large fire-place, 3 feet in diameter and 4 inches deep.

A smaller fire-place, 12 inches in diameter and 2 inches deep, was about 4 feet south of the larger pit, measuring from the centers. On the north side of the room, leaning against the wall, was a flat rock, the surface dimensions of which were 12 by 15 inches. This was on the side of the room which adjoined Room 79. West of this rock, at a distance of 3 feet, measuring from the centers, was a boulder 10 by 12 inches in size, against the side of the room. Contents: 1 arrowpoint, pieces of animal bone, and 84 potsherds. A number of pieces of mica-schist were found on the floor.

Room 67. The floor, of adobe, was 11 inches below ground-level. The sides of the room were plastered from the floor up to a height of about 6 inches. There was no evidence as to the nature of the superstructure, although the room had plainly been burned. The debris which filled it was of adobe and stone with an admixture of charcoal. Just west of the center of the floor was a fire-place, 4 inches deep, 15 inches in diameter. Near the northeast side was a circular bed of ashes, apparently thrown out of the fire-place. Contents: 2 long projectile points, 1 fragment of a disc carved from the horn of a mountain-sheep, pieces of animal bones, 1 fragment of a gaming disc made from a black-on-white potsherd, 20 flint chips, and 160 potsherds. In the debris which covered the floor was an unusual number of water-worn pebbles.

Room 68. This lay southwest of Rooms 30 and 33. There were no surface evidences of the room. The floor was surfaced with adobe and was from 9 to 15 inches below the surface of the mesa. The sides were of natural soil. From the quantity of ashes and charcoal of the floor, we concluded that the room had been burned. The debris was made up of adobe and stones. Near the center of the floor was a fire-place, 15 inches in diameter, and 6 inches deep, from floor-level. On the north side of the room, opposite the fire-place, was a boulder, 9 by 12 inches deep, set against the wall. It may have been a doorstep. This was an example of a boulder associated with a rimless fire-place. Contents: 119 potsherds.

Room 69. This was evidently a storage-place, and was built outside of the south wall of Room 5 and against it. Its floor was 17 inches below ground level and was surfaced with adobe. The walls were plastered with adobe. A debris of adobe and stones filled the room. There were no objects in it.

Room 70. This was marked on the surface by a low, circular mound of boulders, just east of the center of the courtyard. Beneath the boulders was the natural mesa soil. Whatever this mound signified, we failed to learn its meaning. A fragment of a mano lay among the stones of the mound.

Rooms 71 and 72. These were storage places built outside the southeast walls of Rooms 14, 20 and 15, and against them. The

portions of their walls still standing were from 12 to 15 inches high and 4 to 5 inches thick. The floors were of adobe. A few potsherds were found in each room. In the angle formed by the meeting of the northeast wall of Room 71 and the southeast wall of Room 14, was the base of a heavy adobe buttress.

Room 73. This was built against the northeast wall of Room 37. The remains of its walls stood from 9 inches to 13 inches high. It was filled with a debris of adobe and stone. No objects were found in it.

Room 74. This storage place was built against the northeast side of Room 32. From 5 to 13 inches of the base of its walls still stood. A few potsherds were found in the debris.

Rooms 75 and 76. These were two circular storage places with heavy adobe and stone between them, built against the northwest walls of Rooms 25, 26 and 11.

Room 77. This was roughly circular, and built against the west walls of Room 13 and 17. A heavy buttress of adobe reinforced the north wall of Room 77 and the west wall of Room 17. A lighter buttress stood against the south wall.

Room 78. This was a circular storage place built against the west wall of Room 19. A heavy adobe buttress reinforced the south side.

Room 79. In every way similar to the rectangular rooms in the chain surrounding the courtyard, this may have been a storage room for use by the occupants of Room 66, which adjoined it. Its floor surface was 7 inches below the surface of the mesa. Contents: 3 arrowpoints, 2 potsherds. Ashes covered a portion of the floor.

Room 80. The floor was of natural soil, lying 6 to 8 inches below the ground-level and covered with a debris of adobe and stone. There was no evidence as to its use although it probably was a storage place. Contents: 2 flint chips and 70 potsherds.

Room 81. The floor was of natural soil, from 8 to 12 inches below the mesa surface, and covered with adobe and stone. In the southwest corner was a small pit-like depression, apparently too small for any use. It probably was due to the activities of a rodent. Contents of the room: 2 arrowpoints, 1 flint chip, 18 potsherds.

Room 82. This was very similar to Rooms 80 and 81. Its floor was of natural soil, 6 to 8 inches below the ground-level. Contents: 1 bone awl, 1 arrowpoint, 3 flint chips and a few pieces of animal bone and 22 potsherds.

Rooms 83 and 84. These were storage places built against the south walls of Rooms 3 and 4. Room 83 contained a fragment of a mano. Both rooms contained potsherds. Only the bases of their walls were standing, to a height of about 5 inches.

OUT-OF-DOOR FIRE-PITS

As we searched the mesa-top with the soil auger, boring holes every two feet, we carefully explored every spot where the core brought up by the auger contained traces of ashes or charcoal. This method discovered 36 out-of-door fire-places, which are described in Table 2.

ASH-LAYERS, AREAS OF DISTURBED EARTH, AND
MISCELLANEOUS PITS

Complete absence of any trace of refuse dumps, either on the surface of the mesa or on its sides, was disappointing. We searched eagerly for such dumps and examined every spot where ashes, charcoal or disturbed soil was found.

Ash-layer 1. The only extensive ash-layer was located in the angle between Rooms 16 and 24, lying between the rooms and the edge of the mesa. The layer was 20 inches deep, but thinned out and disappeared before reaching the edge of the cliff. This was disappointing because we had hoped that here was our refuse dump. We still suspect that refuse was dumped over the edge of the mesa at this point but we have no evidence to support the conclusion except the circumstantial evidence of nearness to the edge and the presence of the ash-layer, so handy to an ideal place for the disposal of rubbish.

The ash-layer, like others found on the site, was practically barren of artifacts. It did, however, yield a bit of twine, from a depth of about 5 inches. It was imbedded in wood ashes and had not been exposed to moisture.

Ash-layer 2 was just east of Room 17. In it was a mass of broken pottery, covering a space 3 feet wide by 3 feet 6 inches long. These sherds, 480 in number, were in a flat pile and the aggregation was of such a peculiar nature that we called Mr. Harrington's attention to it. He suggested that we be on the lookout for burials in the near vicinity, for his previous experience in the Moapa valley had been that burials were almost always found near such a mass of potsherds. Two burials were afterwards found within 10 feet of the pottery; these were marked Graves 2 and 3. Ash-layer 2 was 3 feet wide and 6 feet long. The ashes covered the pottery to a depth of 2 inches and there was an inch-deep layer of ashes beneath the sherds. A mano, and a few flint chips were in the ashes. Three inches beneath the bottom of the ash-layer was an arrowpoint.

West of Room 16 was an area, lying between Rooms 16 and 47 and the northwest walls of the rooms in the southwest wing, extending to within about 10 feet of the edge of the mesa, where evidence of disturbance of the soil was found. We removed the upper 2 or 3 inches of earth and uncovered what seemed to have been the surface

of the area at the time the site was occupied. This former surface was smooth and hard and stained with ashes. In the course of this process 332 potsherds were recovered, also 3 arrowpoints and a few pieces of animal bone. As we approached the edge of the mesa we found a number of pieces of pottery from the broken rims of vessels, of small diameter and of unusual thinness, some of it less than 0.1 inch thick. These sherds were of the predominating corrugated ware and seemed to be fragments of the rims and necks of water-ollas.

Ash-layer 3 was a space 5 feet wide, 8 feet long, 5 inches deep, filled with ashes, gravel and containing 2 pieces of flint and a few potsherds.

Ash-layer 4 was 4 feet 4 inches wide, 6 feet long and 5 inches deep. It contained a few potsherds.

Ash-layer 5 was vague and ill-defined.

Ash-layer 6 was between Fire-pit 3 and Room 56 and extended east to the upper end of the small "wash" indicated on the ground plan of the site. It was an area of soil containing traces of ashes, bits of charcoal and fragments of pottery. This was in a drainage-way, which accommodated the run-off during the infrequent rains. If this was the site of a refuse-dump, nearly all of the dump had been washed away.

Ash-layer 7 was at the head of a drainage-way and may have been the remains of a refuse dump. It contained ashes, bits of charcoal and a few potsherds.

East of Room 55 and Fire-pit 24 was a similar drainage-way. The soil to a depth of 4 or 5 inches contained ashes, charcoal and a few potsherds. Here again the run-off due to rainfall had found escape from the mesa-top. If there was a refuse-dump at this point all of it had been carried away by wind and water.

Pit 31 contained a large corrugated cooking-pot (Fig. 8), placed mouth down in a hole which evidently had been dug for its accommodation. No trace of ashes or charcoal was in the earth surrounding it and the hole had been made just large enough to hold the vessel. Not over half an inch of soil covered the bottom of the pot. It was absolutely empty and there was no sign that anything had been placed in it when it was hidden in the hole. The pot was intact except for a decayed and crumbled portion of the rim and a few cracks. The writer discovered it while prospecting with the soil auger, by thrusting the auger through the bottom of the pot. It had previously withstood the vicissitudes of 10 centuries or more.

Pit 32 was a rectangular depression, 20 inches wide, 24 inches long, 10 inches deep. It contained 1 hammer stone, a few potsherds and a mixture of charcoal, ashes and gravel.

Our final work at Mesa House was the trenching of the soil



Fig. 8. Corrugated cooking pot in situ, Pit 31.

surrounding the rooms which enclosed the courtyard and which made up the southwest wing. These trenches exposed the standing portions of the walls and uncovered the storage rooms built against the inside walls of the main house. We found a number of objects while trenching, notably a clay pipe, of the straight type (Fig. 13e and f), outside the northeast wall of Room 37 and a group of arrowpoints, in the debris from the inner walls of Room 28.

BURIALS

The remains of seven human individuals were found in six graves. Two of these, an adult and an infant, were in Grave 1, excavated by Mr. Louis Shellbach III and described by him in his paper. One other adult burial was found, in Grave 4. The other remains were those of infants.

Burial 2 was in a grave found a few feet from the southeast corner of Room 9. The grave was oval, 21 inches wide, 25 inches long, 39 inches deep. On the bottom lay the bones of a child, on its back, knees doubled. The skull was in the southeast corner. The bones were badly decayed and partially disturbed, probably by rodents. The back of the skull rested on a fragment of an undecorated cooking-pot. Beneath the pottery was a bone awl (Fig. 14n), somewhat shattered. A flint chip was the only other object found in the grave. Surrounding the bones was a mass of earth, loose in texture, of a peculiar greenish color, presumably the result of chemical change in the soil wrought by the products of decaying organic matter. The

bones were without value as specimens because of their decayed condition and were reburied.

Burial 3 was in a cist (Fig. 9), in the northeast corner of Room 18. The sides and ends of the cist were sandstone slabs, set on edge. In the cist were the almost completely decayed bones of an infant. The child had been buried face down, with the head to the southwest. The grave was 11 inches wide, 14 inches long, 4 inches deep. The back of the head and the back of the pelvic bones were above the floor level, at time of burial. With the disappearance of the superstructure of the room the tiny grave was exposed to the elements, which in course of time sheared away the back of the skull and the pelvic bones. The fact that any of these fragile bones remained is excellent testimony to the extreme dryness of the climate: it also testifies to the fact that such rain as does fall, fails to wet the soil to more than a very shallow depth.

Burial 4 was an intrusive grave in Room 51 (Fig. 10). The body of an adult was buried on its right side, flexed. The sex is undetermined. Resting on the knees was a shattered water-olla, of corrugated ware. This may have been crushed by the weight of the grave earth, either when thrown in or as it settled. The skull was in the northwest end of the grave, facing southwest. The grave was 25 inches wide, 34 inches long, 40 inches deep, measuring from ground-level. The top of the skull was 28 inches below the surface. The ribs of the left side were partially absent. The bones of the hands were scattered, probably by rodents. A few potsherds were scattered through the filling of the grave. A misdirected stroke of the trowel in the hands of the writer was responsible for the hole in the skull. The bones were well preserved. The skull showed deformation and the cranial index is 87.7. There was every indication that this grave had been dug in Room 51 after the room had been abandoned and had been filled up with refuse.

Burial 5 was in the west side of the bottom of Room 55, in a small pit about 12 inches in diameter and 4 inches deep. In it were the bony centers of the vertebrae of an infant. No objects accompanied these bones. Absence of all traces of limb-bones and of skull made it impossible to determine the position of the body when buried.

Burial 6 was in a grave dug in Room 59 after the abandonment and filling of the room with rubbish and earth. The grave contained the skeleton of a young child. The axis of the body lay northeast and southwest, the head being to the southwest. The body was extended. Above the bones, in the soil which filled the grave, were fragments of half a cooking-pot, of corrugated ware. This proved to be a portion of the pot found in Room 21. A fragment of a mano was found in the earth above the skeleton. The grave was 12 inches wide, 18 inches long, 31 inches deep.



Fig. 9. Burial No. 3. Cist burial of an infant in Room 18.



Fig. 10. Burial No. 4 with Pot.

Two dog skeletons were found on the site. One was in Room 9 and was marked Dog-burial 1. The grave was a niche in the east wall of the room about 1 foot long and extending 3 inches into the floor. The dog was buried in a sleeping position, with its nose on its paws. No objects accompanied it.

Dog-burial 2 was in Fire-pit 35. The pit was 2 feet 6 inches in diameter and 12 inches deep; it contained ashes. In the ashes lay the skeleton of a puppy. A few potsherds were in the soil above the skeleton. The bones were not burned and showed no effects of heat.

MINOR ANTIQUITIES

Having described the major antiquities of the site, which comprised remains of the houses, rooms, pits, graves, etc., we now turn to the minor antiquities or artifacts recovered from Mesa House.

A survey of the objects found on the site gives a strong impression of poverty on the part of its people. The only exception was in the objects found in Grave 1 and described in Schellbach's report.

A list of artifacts characteristic of Pueblo sites but not found at Mesa House would include such objects as pecking and pounding stones, hammers and axes, either grooved or not grooved, and particularly polished stone hammers and axes, which are not found in the Moapa Valley; arrow-straighteners, "skinning knives," mortars, bone-scrapers or fleshing tools, bone paddles or spatulas, bird-bone tubes, wooden artifacts, ornaments of shell, of selenite, calcite or of stone.

One category of objects is very strikingly absent from Mesa House, that of agricultural implements or "garden tools." One would naturally expect to find hoes of some sort, in a village occupied by a farming people; but no trace of anything of the sort was found.

Evidence of food-stuff found on the site indicate that the people of Mesa House ate sparingly of flesh, if paucity of animal bones is considered. This is not surprising in a country where game was scarce, as it was, comparatively, in the Moapa Valley. Bits of charred corn cobs, a few charred kernels of corn, several charred "screw-bean" pods and a few seeds of a variety of squash, give the only information regarding the vegetal food of the people.

TEXTILES

Sixty-six fragments of basketry were recovered from Room 10. These were carbonized by fire. They are of the coiled type, three-rod foundation (Fig. 13k, l, m). The foundation rods are from .1 to .12 inches in diameter. They were laid side by side in the coils, not one above the other. In some of the coils a splint or a small rod overlay the 3-rod foundation. Where a splint or fourth rod is present the stitches pass over the 3 rods and down under the welt of

the coil below. The stitches interlock, sometimes splitting the stitches above. The splints of the weft average .1 inch in width. The stitches are pressed close together and there is evidence of skilful workmanship. The fragments average .28 inch in thickness. The largest is 2.6 inches wide, 3.7 inches long. No evidence of decoration or design was noted in this basketry. The specimens are completely blackened by the process of carbonization.

CORDAGE

In Ash-layer 1, at a depth of 5 inches, was found a piece of cord about 4.1 inches long and .04 inches in diameter. It was of 2 strands, twisted clockwise, probably from the fibres of Indian hemp (*Apocynum*). This cord is not carbonized. It was imbedded in clear, dry wood-ashes and thus preserved.

A fragment of cordage was found in Room 10, loosely twisted clockwise, from yucca fibre.

Small pieces of material, 7 in number, were found in Room 9. The largest was 1.2 inches wide by 1.3 inches long and .2 inches thick (Fig. 13n). The elements which made up this material are of cord, .04 inches in diameter, of 2 strands, twisted clockwise. The fibres are apparently of Indian hemp (*Apocynum*) and the fragments are probably pieces of a loosely twisted rope, such as was used for breech-clouts, and belts.

OBJECTS OF WOOD

The charred, pointed end of a wooden stick was recovered from Room 64. The piece was too small to give any idea as to its purpose.

A section of a post was found in one of the post-holes in Room 9. It is 4.2 inches in diameter, and 11.8 inches long. It is not carbonized but is fairly well preserved. It is probably mesquite wood. The post-hole from which it came was 26 inches deep. The fragment of post resisted decay because it had been burned to the level of the floor in which it stood and was capped with a heavy layer of adobe, which protected it from moisture.

A piece of a stick, split, .8 inch wide and 3.5 inches long, the bark and wood uncharred, was found in Room 10. One end had been in the fire. It was probably a piece of fuel.

OBJECTS OF STONE

Metates. Two entire metates and fragments of another represent the metates from Mesa House, except for one surface find. The one shown in Fig. 5j was in Room 50, associated with its mano. The metate was lying face down with the mano beneath it. The distal end of the metate had been broken off but the broken edge

showed plainly that the stone was still serviceable and had been used after the break occurred. This specimen is of hard red sandstone. Its dimensions are: width, 10.4 inches, length, 14.4 inches, thickness, 1.8 inches. The trough is .6 inch deep at the distal end of the stone.

The metate shown in Fig. 5i came from Room 46. It is of gray sandstone. Its dimensions are: width, 9½ inches, length, 16 inches, thickness, 3 inches. The depth of the trough at the distal end was .2 inches; toward the center, .7 inches.

In Room 23 were 6 fragments of a large red sandstone metate. Fig. 5h shows the restored object. Its dimensions are: estimated width, 18 inches; length, 22 inches; thickness, 3 inches. The depth of the trough at the distal end was nil; toward the center, 1 inch.

A fragment of a deep-troughed metate, made from a slab of breccia, was found on the surface, associated with the boulders on one of the mounds. The trough is about 4 inches deep. This fragment became of especial interest after we had found a fragment of a similar deep-troughed metate, also of breccia, on the north side of Hill No. 2, on Site 52A, 1500 feet east of Mesa House. The two fragments do not belong to the same metate. Site 52A is a small house cluster, which was occupied by a Pueblo people of the Lost City period, which represents Pueblo II in the Moapa Valley.

In a number of reports on Pueblo sites metates have been referred to as being of the "usual type," no further description being given and in more than a few cases no illustration being shown. The type of metate found at Mesa House is shown in Fig. 5h, i, j, and a searching of the available literature has brought out the fact that they are essentially the same as Hough found in a pit house village site at Luna, New Mexico;⁵ which Roberts Jr. found at Shabik'eschee Village,⁶ "a late Basket Maker site in the Chaco Canyon, New Mexico;" which Judd found in 2 pit houses⁷ in Chaco Canyon and which Jeançon found in the Taos valley, New Mexico.⁸ Metates of the same type, but with multiple troughs were found at Pueblo Bonito.⁹

The fact that the Mesa House metates are virtually identical with those from the Basket Maker III site which Roberts describes and with those from the pit house sites described by Hough and by Judd, is significant because if this type is a Basket Maker III form of metate, as the writer thinks, it shows the persistence of a Basket Maker III influence at Mesa House.

5. W. Hough, A Pit House Village at Luna, New Mexico, *Proc. U. S. Nat. Mus.* 1920, 55, 417.

6. F. H. H. Roberts, Jr., Shabik'eschee Village, *Bur. Am. Eth.*, 1929, *Bull.* 92, Plate 26.

7. N. M. Judd, Two Chaco Canyon Pit Houses, *Smithsonian Rep.* 1922, Pl. 1.

8. J. A. Jeançon, Archaeological Investigations in the Taos Valley, New Mexico, *Smithsonian Misc. Coll.* Vol. 81, No. 12, Pl. 6b.

9. C. Wissler, Pueblo Bonito—as made known by the Hyde Expedition, *Nat. Hist.* Vol. XXII, No. 4, P. 351.

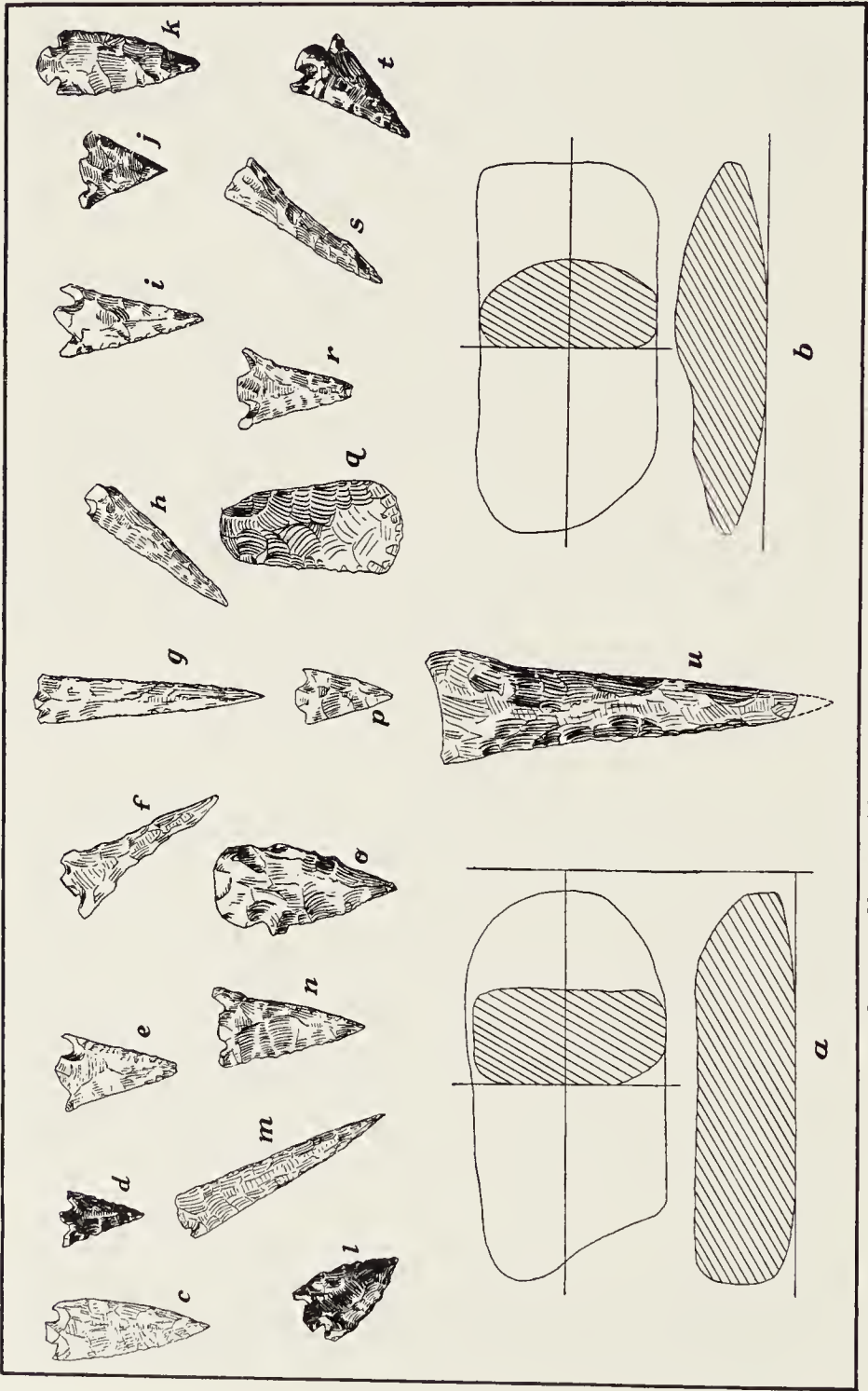


Fig. 11. Manos, with cross-sections (a, b) and chipped objects.

It is at least interesting to note that the only metates found at Mesa House were found south of the court-yard, two of them in detached houses and the other in one of the storage rooms, Room 23. The fact that only three metates were found in a ruin containing 84 units, is quite as noteworthy as was Jeançon's experience at Po-Shu-Ouinge, in the Chama Valley, New Mexico,¹⁰ where he found only 5 metates in a ruin containing 127 rooms. Jeançon records, however, the finding of many manos. We found 6 whole manos, and 7 fragments, widely distributed.

Manos. The manos are all of the same general type and material. Several are made of very hard sandstone; the rest are from quartzite and one from a fine-grained breccia. Their form is shown in Fig. 11, a and b.

An artifact which resembles the type of mano found in southern Paiute camp-sites in the Moapa Valley was found in 2 pieces, about 6 inches apart, at a depth of 5 inches in the rubbish which filled Room 51. While it resembles the Paiute manos, the writer concludes that it is of Pueblo origin. Jeançon reports a similar artifact from the Chama Valley, New Mexico, calling it a "polishing stone for floors."¹¹ Judd shows a like object from a Pueblo site north of the Rio Colorado;¹² and Morris found a similar artifact¹³ at Aztec ruin. Both the sides and the edges of this object which is of sandstone, show the effect of rubbing and the ends seemed to have been pecked, or bruised by pounding or by bumping against hard material. It might have been used in smoothing adobe floors or plaster. Its dimensions are: width, 3.3 inches, length 4.5 inches and thickness 1.4 inches.

One fragment of a mano is grooved transversely on one face, near the end.

Rubbing Stones. Stones obviously used for abrasive purposes, such as for shaping bone implements and wooden artifacts, are represented by seventeen objects. These are of sandstone and range in texture from coarse to very fine. One such stone, of very fine grit, has on its surface streaks of green, such as might result from rubbing the stone with some green "paint stones."

Two pieces of lava, shaped like manos, may have been used as rasps or for fleshing hides.

There were two fragments of sandstone which seem to have been used in the process of scraping and smoothing pottery.

Hammerstones. Crudely chipped stones, ten in number, were

10. J. A. Jeançon, Excavations in the Chama Valley, New Mexico, Bur. Am. Eth. 1923, Bull. 81, p. 21.

11. J. A. Jeançon, Excavations in the Chama Valley, New Mexico, Bur. Am. Eth. 1923, Bull. 81, pl. 18b.

12. N. M. Judd, Archaeological observations north of the Rio Colorado, Bur. Am. Eth. 1926, Bull. 82, Pl. 50b.

13. E. H. Morris, The Aztec Ruin, Anth. Papers, Am. Mus. Nat. Hist. 1919, Vol. XXVI, Part 1, P. 20, Fig. 8b.

used as hammers. Four of them, shown in Fig. 12a, c, d, and e are of quartzite, and are interesting because when first handled they drew moisture from the palm and the fingers of the hand, as do the quartzite salt picks found in the nearby salt caves. Figures 12a and 12b are different views of the same pick. The nearest salt cave is about 12 miles south of Mesa House, in the Virgin River valley. Picks fashioned from quartzite boulders were used in mining the rock salt in this cave and in others near by. Some of them were hafted. The ones found at Mesa House were unhafted. The writer thinks they were used to break up lumps of rock salt brought to the site from one of the salt caves.

In Fig. 13j is shown a small stone implement, which may have been used as a wedge. Disc-like in form, and thin, one edge of its circumference is chipped to a cutting edge and the opposite edge is chipped as though by pounding to force it into whatever object it was used upon. This object is 1.1 inches wide, 1.2 inches long and .3 inch thick. It is of quartzite.

Discs. Nine small stone discs, from .7 to 1.4 inches in diameter and from .2 to .3 inch thick, made from quartzite pebbles were found. These were probably used in games.

Fig. 13h shows a disc of fine grained, banded sandstone, perforated and polished on both faces. One face had been split off after the object was finished. It is 1.2 inches in diameter and .1 inch thick.

Chipped Objects. With the exception of a few objects made from quartzite, described elsewhere, all of the chipped and flaked artifacts from the site are fashioned from what is commonly called "flint," or from obsidian.

The use of the term flint, in connection with anything native to the Americas, is sometimes offensive to people who insist upon technicalities. As clearly explained by Fowke,¹⁴ many geologists prefer to restrict the name "flint" to the variety of the stone found in the chalk beds of western Europe and England. This European flint comes from the spicules of sponges which lived in the seas of the Cretaceous period. Chert, the American cousin of the European flint, has a different origin and is found in different geological horizons. It is formed from the siliceous skeletons of microscopic animals and plants which flourished in basins and depressions near the shore-line of oceans in the Devonian and Carboniferous periods. The chert from the Devonian strata is not suitable for implements, being too brittle and too prone to shatter. Cherts formed in the upper divisions of the Mississippian and lower portions of the Pennsylvanian divisions of the Carboniferous period are well adapted for use as weapons and implements, being quite amenable to the flaking and

14. G. Fowke, *Aboriginal flint quarries*, Bur. Am. Eth. 1926-27, 44th Ann. Rpt. pp. 505-506.

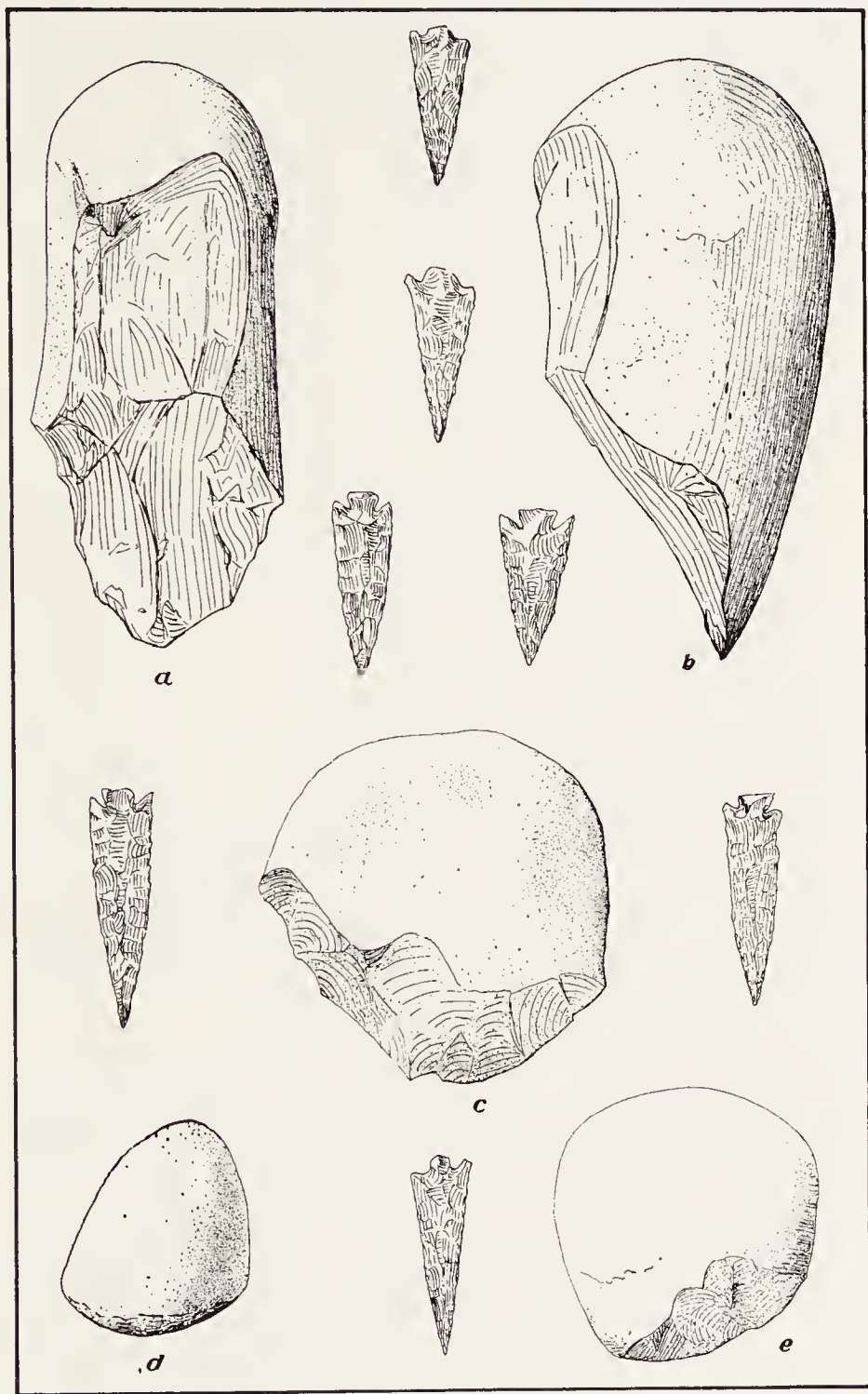


Fig. 12. Picks and hammerstones of quartzite (a, b, c, d, e) and arrow-points.

chipping process. Such cherts include the stone called "silica," the flinty limestones, buhrstone, "flint," jasper, hornstone, basonite or lydite, either glassy or dull, novaculite, chalcedony, or, in banded or mingled coloration of chalcedony, "agate."

In this report the writer uses the term "flint," which is commonly understood and sufficiently descriptive. The Mesa House flints range in color from white to dark brown, with intermediate grays, browns and reds.

The following chipped and flaked objects were found at Mesa House:

- 49 entire arrowpoints. 42 flint, 6 obsidian.
- 21 broken arrowpoints. 20 flint, 1 obsidian.
- 1 entire flint blade. Fig. 11q.
- 18 fragments of flint blades.
- 3 unfinished objects, of flint, indeterminate in nature, either blades or projectile points.
- 1 object, Fig. 11o, which is either a divergent type of projectile point or a blade which, after an unsuccessful attempt at re-sharpening, was discarded.
- 1 flint drill.
- 1 blank, of chalcedony, 3.5 inches wide, 6.4 inches long, and 1 inch thick.

All of the arrowpoints are essentially like those shown by Roberts from the late Basket Maker site, Shabik'eschee.

It is unfortunate that the published reports on Basket Maker and Pueblo sites contain so little material on which to base a comparative study of arrowpoints; but valuable comparative data are found in the report by Roberts on Shabik'eschee Village.¹⁵ Mesa House arrowpoints are essentially identical with the points from this late Basket Maker site, in form. They are also identical in form with points found in Lost City sites in the Moapa Valley. The writer concludes that the Moapa Valley Pueblo type of arrowpoint shows the persistence of a Basket Maker III trait.

While all of the arrowpoints are of the same essential form, having butts characterized by distinct stems (Fig. 12), flaked on either side by shoulders which in the better made specimens become barbs, there is a variety in size, in the ratio of breadth to length, and in weight.

The smallest point is .8 inch long and .56 inch wide, at the butt. The largest one is 2.4 inches long, .6 inch wide, at the butt. The broadest point is .8 inch wide at the butt and .9 inch long. The narrowest point is .44 inch wide at the butt and 1.86 inches long.

The point lightest in weight weighs a little less than .7 grams.

¹⁵. F. H. H. Roberts, Jr. Shabik'eschee Village, Bur. Am. Eth. Bull. 92, Pl. 28, 1-r.

This is also the shortest point. The heaviest point, which is also the longest, weighs 3.5 grams.

The 49 perfect arrowpoints were grouped according to length, with this result:

- 6 were between .8 and 1 inch long.
- 7 were between 1 and 1.2 inches long.
- 8 were between 1.2 and 1.4 inches long.
- 11 were between 1.4 and 1.6 inches long.
- 10 were between 1.6 and 1.8 inches long.
- 4 were between 1.8 and 2 inches long.
- 3 were between 2 and 2.2 inches long.
- 1 was between 2.2 and 2.4 inches long.
- 1 was 2.4 inches long.

When grouped according to weight the result was:

- 4 weighed less than 1 gram.
- 23 weighed between 1 and 2 grams.
- 11 weighed between 2 and 3 grams.
- 2 weighed between 3 and 4 grams.

These data as to dimensions and weight are given in order that some foundation may be laid for the comparative study of form, size and weight which is bound to come. The greater the number of sites studied and reported upon, in the Southwest, the more apparent it will be that there are certain significant diagnostic cultural criteria in stone objects which cannot well be ignored or lightly passed over.

A group of seven arrowpoints, shown in Fig. 12 were found in the main courtyard, near the walls of Rooms 28 and 36.

Flint chips and spalls, while not numerous, were sufficiently represented to indicate at least some activity in the making of flint artifacts in the village.

MISCELLANEOUS STONE OBJECTS

A small, peculiarly shaped concretion was found in Room 23. We could not determine whether it came there adventitiously or was dropped there by some member of the village. Interest in such concretions seems to have been not uncommon among such people.

A small, black pebble, of the hardness of quartz, has a high polish and has the appearance of a stone such as is used in the finishing and polishing of pottery.

Two pieces of ripple-marked sandy limestone were found, one of them in Room 67. Chester R. Longwell described a ripple-marked sandy limestone in a formation on the east side of the Weiser Ridge, in the Moapa Valley.¹⁶ This formation is about 4 miles west of the

16. *Op. Cit.* p. 44.

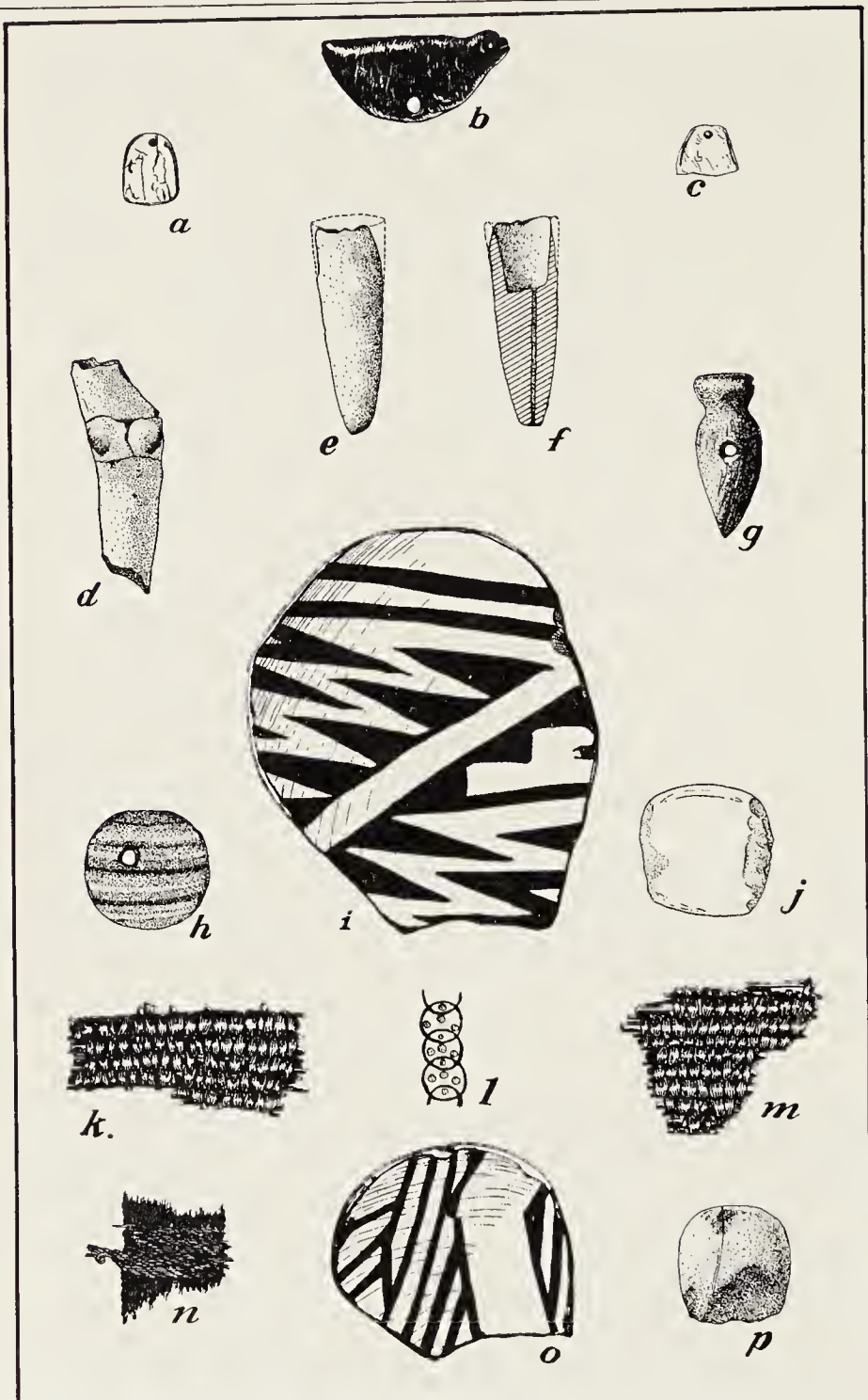


Fig. 13. Turquoise pendants, (a, c). Fetish of horn of mountain sheep (b). Fragment of figurine of baked clay (d). Tubular pipe (e) and cross section of pipe (f). Turquoise fetish (g). Perforated disc of banded sandstone (h). Chipped stone objects (j, p). Potter's scrapers and smoothers, of black-on-white sherd, (i) of black-on-red sherd, (o). Fragments of coiled basket and diagrammatic section (k, l, m). Fragments of belt (n).

Mesa House. If the specimens mentioned above did not come from this spot we cannot guess their source. When at first we noticed the fragments we mistook them for pieces of corrugated pottery.

ORNAMENTS OF STONE

A turquoise fetish, Fig. 13g, was on the floor of Room 59, beneath 16 inches of debris. It was .3 inch wide, .8 inch long, and .2 inch thick.

A pendant and fragments of two others, of turquoise, came from Grave 1. The entire pendant is .58 inch wide, .74 inch long, 1 inch thick. The perforation is .06 inch in diameter. (Fig. 13a and c).

Two beads, one from Room 44 and one from Room 10 are made from stone. One is .08 inch in diameter and .02 and .03 inch thick. The other is .12 inch in diameter and slightly less than .04 inch thick.

OBJECTS OF BONE

Twenty-eight entire and fragmentary bone artifacts were found at Mesa House. Twelve of these objects were complete.

Two gaming pieces are shown in Fig. 14o and q.

The objects shown in Fig. 14g and i were, in the writer's opinion, used as punches in the making of baskets. They were in excellent condition and were highly polished over their entire surfaces, as though by much handling.

Fig. 14j shows a fragment of a bone awl, with a perforated shank.

Several of these artifacts show the effect of heat, the centers being calcined and the ends blackened by fire. These have a high polish.

The most significant thing in connection with the bone objects is the absence of unfinished specimens. It would not have been unusual to find one or more bone awls or punches in various stages of manufacture but such is not the case.

In the absence of diagnostic features such as condyles or joint caps, it has been quite impossible to identify the species of animals represented in the bone objects. We can, however, say with safety that the bone artifacts found at Mesa House were made from the limb bones of ungulates, including the mountain sheep and/or some species of deer and/or some species of antelope. None of the bone objects found were made from bird bones.

Wherever one of these artifacts was found in wood-ashes or in soil with a strong admixture of wood-ashes, beneath a tight capping of adobe, the object was remarkably well preserved. On the other hand, in a pocket in the earth which formed the east side of Room

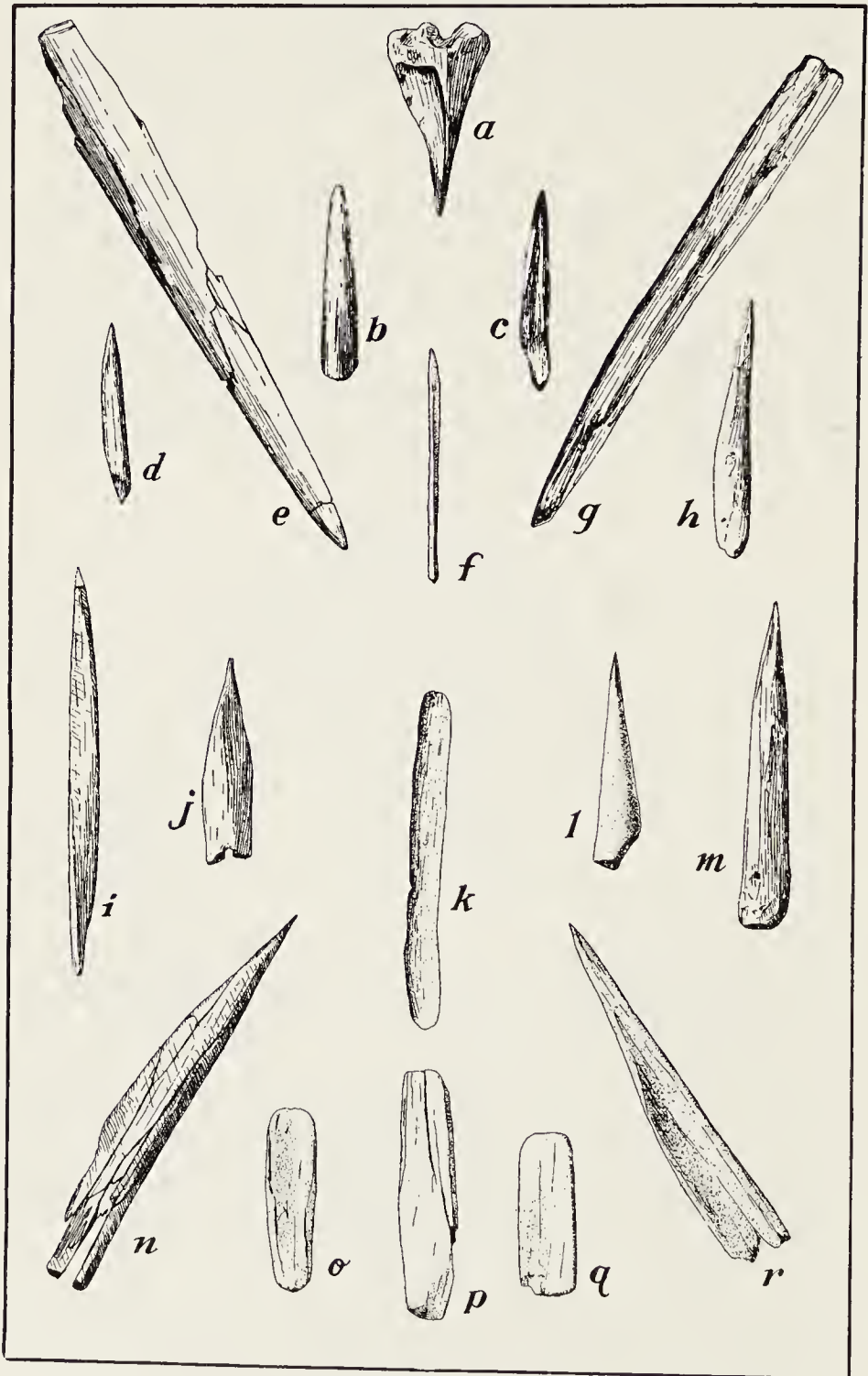


Fig. 14. Bone implements.

59 was found a bone awl, made from a splinter, long and thin, which was quite completely decayed, as though much of the lime in it had been leached out. In this case there was no capping of adobe and no wood-ashes to protect it.

The fact that no bone objects were found in process of making, strengthens the significance of the fact that only one flaked stone object was found in unfinished form and that but few flint chips were present in the refuse. These two bits of evidence may be used to support the idea that Mesa House was but briefly occupied.

OBJECTS OF HORN

In Fig. 13-b is shown a charm or fetish, in the form of a bird, which was carved from the horn of the mountain sheep. This was found in Room 57, at a depth of $5\frac{1}{2}$ inches. A fragment of what seems to have been a disc, made from the horn of the mountain sheep, was found in Room 67, at a depth of 13 inches. It had been perforated.

OBJECTS OF SHELL

One tiny shell bead, from Room 81, is the only shell object recovered by us from Mesa House. It is .12 inch in diameter and .04 inch thick. The perforation is .04 inch in diameter.

POTTERY

Mesa House pottery is represented by 5613 pieces, of which 4 are nearly complete vessels, 1 a small, narrow-necked olla, the other 3 large, wide-mouthed cooking-pots.

The lower Moapa Valley, with at least 77 villages and campsites, contains a great amount of pottery, ranging in type from Basket Maker III through Pueblo I and II and into early Pueblo III and including pottery made by the latest Indians to settle in the valley, the southern Paiute. No detailed, comprehensive study of Moapa Valley pottery has been made, so far as the writer knows. M. R. Harrington, writing of Lost City¹⁷ pottery, reports that at that site plain ware is most abundant in all houses of whatever type. This plain ware was in the form of cooking-pots, water ollas, and canteens. Corrugated ware was next to plain ware in abundance. Harrington observed that corrugated pottery was scarce in the more southerly houses; and more plentiful in the more northerly ones. A rather crude notched type of corrugated pottery occurred everywhere in the site but in the northerly houses a beautifully notched,

17. M. R. Harrington, A primitive Pueblo City in Nevada, *Am. Anthr.* Vol. 29, No. 3, July-Sept., 1927, pp. 269-271.

carefully made corrugated ware was found in quantity. Lost City corrugated ware was in the form of cooking-pots, bowls and canteens. In the northerly houses the typical form was a cooking-pot, the body of which was decorated with notched corrugations and the neck with plain, straight coils. On some of the vessels alternate bands of straight and waved corrugations occurred.

It is unfortunate that more information regarding Moapa Valley pottery is not available, for without it a thorough comparative study of Mesa House ceramics cannot be made. Harrington has, however, given a basis for at least one significant comparison, namely, that while at Lost City plain ware was in the majority, at Mesa House corrugated ware was the predominating type.

So far as the writer has been able to ascertain, all of the pottery at Mesa House was made by the coiling method. The favorite form of decoration was the leaving of the exterior surface of the vessels unsmoothed. This produced a wrinkled or rugose effect, which is commonly spoken of as "corrugated." The edges of the coils were often notched or indented or even "waved." Some of this corrugated ware from Mesa House has alternate bands of straight and indented corrugations, while much of it is entirely indented. Approximately half of the corrugated ware from the site is of the "blind" or "wiped" type, in which the outer surfaces of the coils, whether straight or notched, have been partially, in some cases quite completely, obliterated by smoothing.

By "plain" ware the writer means smooth, featureless pottery, utterly without decorative device or ornamentation.

Of the 5613 pieces of pottery from this site, 3870 are corrugated, 1035 are plain, 572 are black-on-white, 104 are black-on-red and 32 are black-on-white with corrugated exterior surfaces.

In terms of percentage, 68.9 of the pottery is corrugated, 18.5 is plain, 10.8 black-on-white, 1.9 black-on-red, and .6 black-on-white corrugated.

In form there is a lack of variety. Cooking-pots, bowls and ollas are the only forms represented, except for fragments of one "seed jar." Canteens, mugs, dippers, ladles and vessels with handles are conspicuously absent. Nothing but utilitarian containers are present in the list of vessels or fragments of vessels recovered.

In size the vessels range from a tiny, unbaked "thumb-pot" to the large cooking-pot from Room 37, which stood 13.2 inches high and was 13 inches in its greatest diameter. Only half of this pot was found. A cooking-pot found in Pit 31 is 11.7 inches high, has an average diameter of 12.7 inches, is 11.1 inches wide at the mouth (outside measurement) and 10 inches wide at the neck (outside measurement). The greatest diameter of the bowl is 13 inches and the least diameter 12.4 inches, taken at the same height from the

bottom and indicating a slightly eccentric circumference at that point. The average thickness of the sides of this pot is .2 inches. The edge of the lip of the rim is .12 inches thick.

The corrugated olla from Grave 4 is 6.7 inches high, 8.2 inches in greatest diameter at the bowl, 3.1 inches in diameter at the mouth, 3 inches in diameter at the neck.¹⁸ All of these are outside measurements. The inside diameter of the mouth is 2.3 inches.

The diameter of the mouth of the largest corrugated bowl fragment is estimated, from the projected circumference, as having been about 9½ inches. Rim fragments from a black-on-white bowl indicates a diameter of about 9½ inches and so does a rim fragment from a black-on-red bowl.

In color the pottery runs from black to gray, through a variety of browns and reds. Much of the color variety is due to difference in firing, use and degree of use; old, much-used cooking-pots being much blacker than those which are obviously newer. Some of the difference in color is due to chemical reactions which have taken place through long contact with soil. Many of the corrugated sherds are encrusted with a black substance, which may well be the result of smoke and grease. A few sherds from a small corrugated vessel are red, apparently the result of firing.

In both white and red ware, examples of the use of a slip are found. The writer has used the term "white" to include the lighter and darker grays found in the black-on-white ware. In some of this ware the paste itself has fired gray and no slip was used; and in some the rubbing of the surface of the moist paste in the process of finishing has produced a puddled condition at the surface which much resembles a true slip; but in such cases the particles of tempering material are right at the surface. A few sherds show traces of a red slip on the outer surface, of the sort known as "fugitive" red. This slip, consisting of an impermanent red, not fixed by firing, eventually wears off or rubs off, hence the term "fugitive."

Decoration was done by means of painting and corrugation.¹⁹ All painted decorations are on the inside of the bowls. Corrugation of course was exterior. One fragment of the rim of a small pot shows an incised decoration on the outside of the lip of the rim.

The painted decorations, found only on white and on red bowls, are of black paint, in purely geometric design (Figs. 15 and 16). Some of the painting is nicely and carefully done; in a few cases less care was used and the lines overlap.

18. Illustrated, with other specimens of Mesa House pottery in Fig. 7 of Harrington's Introduction, page 7.

19. (It has been suggested that the term "decoration" be confined to those effects produced by the use of colors; using the term "ornamentation" for devices such as corrugation and indentation, which achieve their effect by manipulation of the surface of the vessel—Ed.)

Some sherds show both inside and outside polishing, in the painted wares. Often the outside of the bowls was left unpolished. Some of the plain ware has been polished on the outside, even when the surface is markedly rough and crudely smoothed.

Mesa House pottery ranges in thickness from .08 inch in certain notably thin, finely made corrugated ware, to .4 inch thick in the heavy, plain sherds from Room 51. A common thickness for all types of ware is from .1 to .2 inch.

The texture of the paste shows gradations from coarse and crumbly to very fine and hard. The "grog" or tempering material is of quartz, some of it in the form of angular, sharp-edged grains, and some of it water-worn. Some of the paste has a large mica content. With few exceptions the paste is homogeneous in texture and shows evidence of having been thoroughly prepared and uniformly fired. Only a few cases of burning or overfiring were observed. The writer found no evidence of use of potsherds for tempering material.

In hardness the range is from that of calcite (3) to feldspar (—6), using the hardness series for minerals. The hardest sherds are found in the black-on-white ware and in a kind of plain ware which we cannot classify according to any named type.

There is a characteristic metallic "ring" to this hard, fine-grained, unpolished ware. Its form cannot definitely be stated because no rim-fragments were observed, although there is a suggestion in the sherds of bowls, rather than of pots.

Some of the sherds show a marked tendency to flake at the edges. The painted ware has a straight, sharp cleavage. This is also true of most of the plain ware and corrugated ware. Some of the cruder types of plain and corrugated sherds show ragged, sloping edges.

Lacking any adequate basis for a comparative study of Mesa House pottery, representative specimens of the complex found on the site were sent to Dr. A. V. Kidder, Mr. Earl H. Morris and Dr. Frank H. H. Roberts, Jr. These men, whose experience in the field of Southwestern archaeology entitles them to be included in the list of those eminently qualified to pass on pottery from that area, very kindly studied the sherds and gave their opinions. In quoting them the writer desires to emphasize the fact that none of the three has had opportunity to examine the Mesa House collection as a whole. They worked independently and have simply examined typical specimens.

Taking up their reports in alphabetical order, we find that Dr. Kidder states that he "should not hesitate to say that the group as a whole (the sherds sent him) is definitely of the early Pueblo III period."

Mr. Morris states: "As a whole the wares clearly range from Basket Maker III to Pueblo II. Although a number of them are ever so slightly off-color in their ensemble of characteristics it is surprising that since they come from a locality so far removed from the Pueblo centers, they should run so true to form."

Dr. Roberts states: "If the lot sent me is truly representative, which I judge to be the case, I should place your site as early Pueblo III. There are a number of fragments quite suggestive of Pueblo II and some even of an earlier date."

Kidder found the corrugated ware "obviously Pueblo III." Roberts classed one sherd with blind notched corrugations as Pueblo III; two deeply notched corrugated sherds as Pueblo II or III; and a sherd with straight corrugations as Pueblo II or III.

Morris classed the deeply notched corrugated sherds as Pueblo II; but a blind corrugated sherd as Pueblo III, thus agreeing with Roberts. Kidder's sherds included no blind corrugation; and it is noteworthy that Kidder classed the deeply corrugated sherds as Pueblo III, Morris placed them in Pueblo II and Roberts in Pueblo II or III.

A study of 451 corrugated sherds from 18 rooms chosen at random (all of them in the chain of rooms surrounding the courtyard and filled with their own debris) showed that 45 per cent of these sherds were of the blind type classified by Morris and Roberts as Pueblo III. Fifty-five per cent of the 451 sherds were of the deeply corrugated type classed by Kidder as Pueblo III, by Morris as Pueblo II and by Roberts as either Pueblo II or III. The same results were had from a study of the entire lot of 3870 sherds from the site as a whole, which indicates a uniform distribution over the site.

Kidder identified his black-on-white sherds as follows: "Of the three pieces of black-on-white, the two largest (Figs. 15c, 16e) belong to what I believe is going to prove a distinct western type. It is a refined and specialized outgrowth of San Juan Pueblo II black-on-white. The third piece (Fig. 16b) with the hatched triangle is less distinctive but may well belong to the same category. The smallest black-on-white fragment (a fourth sherd, Fig. 16i), looks suspiciously like Pueblo I and would arouse no comment in the Kayenta country if found in a Pueblo I deposit. It is too small, however, to bank on very definitely, but I am suspicious of it."

Morris classed some of his black-on-white sherds (Fig 15g) as Pueblo II; one sherd (Fig. 16k), very like Kidder's Pueblo I black-on-white, as Pueblo I or II, another as Pueblo I or II (Fig. 15i) and another (Fig 16j), as Pueblo II but resembling Pueblo I.

Roberts classified two of his black-on-white sherds (Figs. 15e and f), as Pueblo III and two as Pueblo II or III.

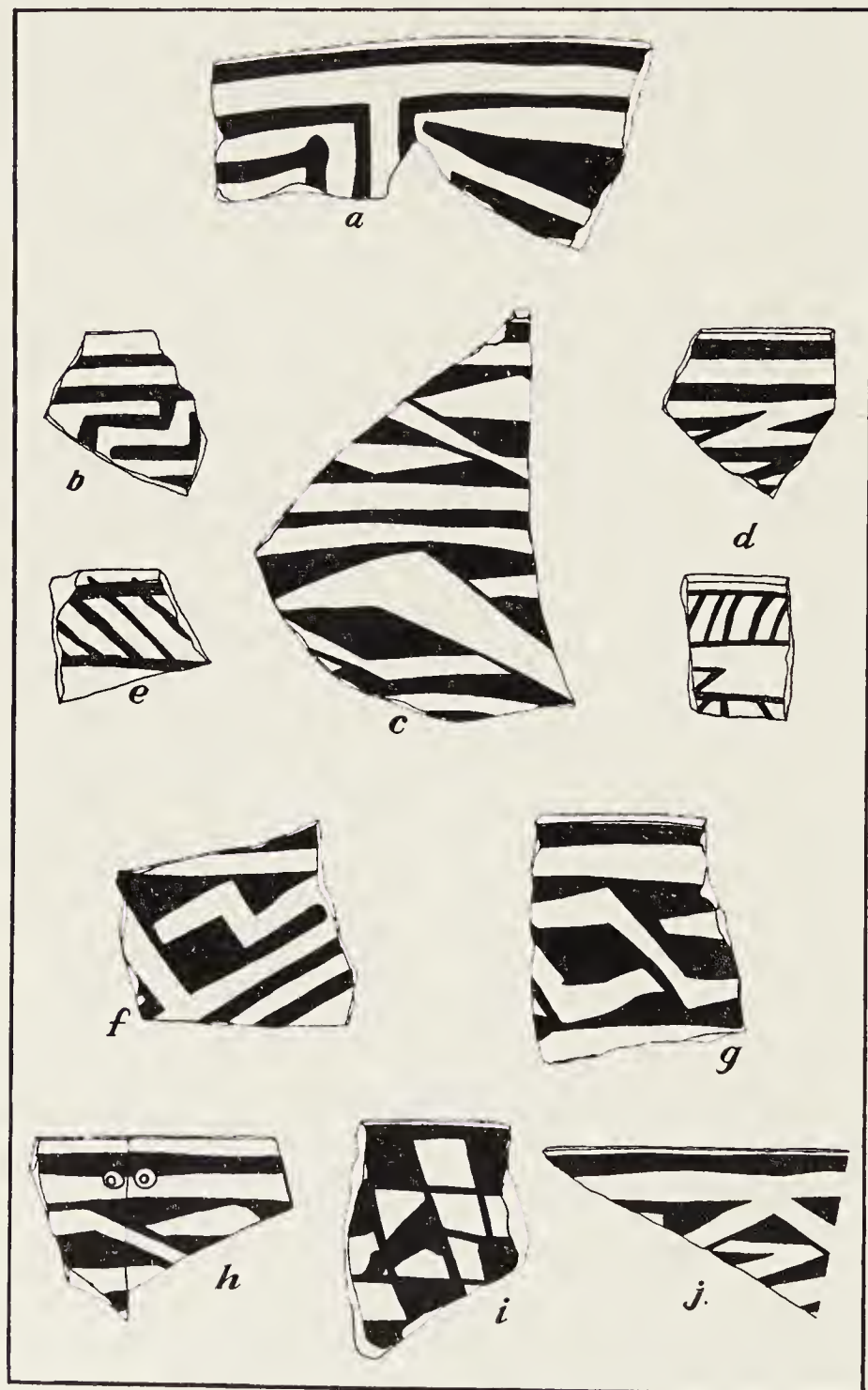


Fig. 15. Black-on-white designs.

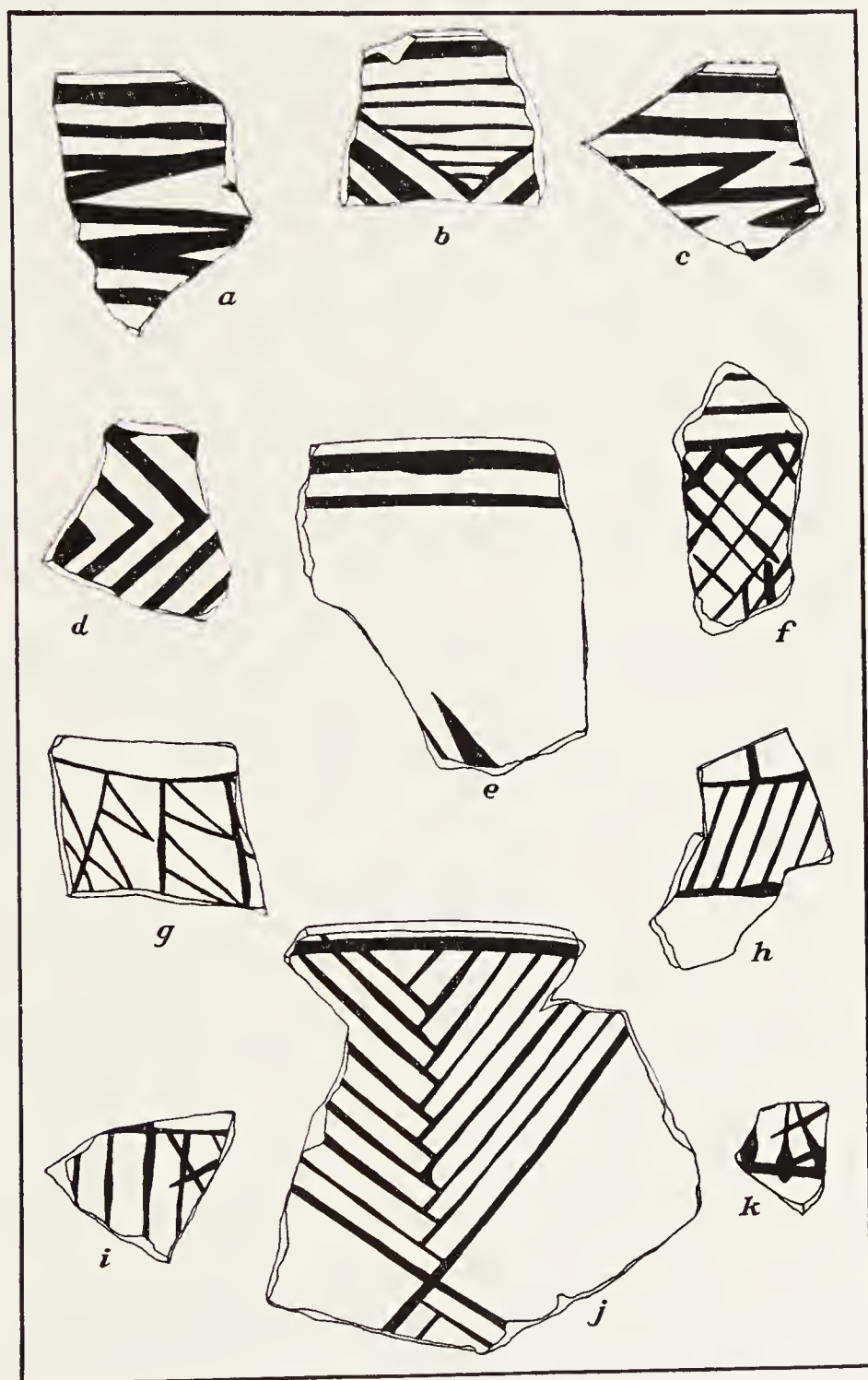


Fig. 16. Black-on-white designs.

Kidder says of the black-on-red specimens: "The red ware is of the sort associated in the Kayenta country with that we used to call 'proto-Kayenta black-on-white' but which at Pecos Conference we decided to call Tusayan." This, if the writer is correctly informed, is equivalent to saying that these red sherds are Pueblo III.

Morris was sent a different type of black-on-red, which he classified as Pueblo II.

The red sherds sent Roberts, one of which was of the type sent Kidder, were classified by him as Pueblo III. One of these red sherds resembled closely one sent Morris and classified by him as Pueblo II.

None of the three men was able to identify the very thick, heavy, plain sherds from Room 51 or the plain sherds with micaceous inclusion.

All three lots included a plain, thick, heavy, gray ware, with rough, somewhat pitted exterior, rather harsh to the touch. This ware was new to Kidder and Morris: Roberts thought his specimens either Pueblo II or III.

Kidder classed a fragment of bowl rim, the outside of which is rough, with the tempering material plainly showing at the surface and even protruding from it, as Basket Maker III. Morris and Roberts classified similar sherds as Basket Maker III.

A very crude fragment of bowl, unevenly fired and very flaky at the edges, was classified by Morris as Basket Maker III.

Several of the sherds sent these men were plainly of the "fugitive" red type. Morris classed his as an "interesting example of 'fugitive red' wash. Could be highly evolved Basket Maker III or early Pueblo I." Roberts reporting on a similar sherd says: "Basket Maker III or early Pueblo II. Fugitive red occurs in both horizons."

It would appear from the classification made by Kidder, Morris and Roberts, that Mesa House pottery is indeed complex, with wares from four different but consecutive horizons, those of Basket Maker III, Pueblo I, Pueblo II and Pueblo III. If this is true, to what horizon does Mesa House belong?

The Basket Maker III sherds may be disregarded in considering this question. They are very few in number and there is no reason to believe that they originated at Mesa House. The type of sherds suspected of being Pueblo I are even more negligible in quantity and hence even less significant.

There was no such thing as stratification due to sequence of cultures or periods, at Mesa House. The pottery complex was uniform over the entire site. Basket Maker III, Pueblo I and Pueblo III sherds were found in the same rooms, as in Rooms 10 and 51, for

example. Wherever corrugated sherds were found, they might be either Pueblo II or III or both. This was true at all depths.

If the corrugated ware indicates a borderline site between Pueblo II and III or a site which is either one or the other, the plain ware does not settle the matter. Of the 1035 plain sherds 221 or 21 per cent are of a sort which for convenience is called Colorado River ware, being very like that found in southwestern Arizona and southern California, including the Mohave desert, which is quite near the Moapa Valley. About 3 per cent of the plain ware is Basket Maker III, with possibly some Pueblo I, leaving 76 per cent which is unnamed and may be either Pueblo II or III or both.

The black-on-white and the black-on-red ware are, with the exception of a very few black-on-white sherds which are either Pueblo I or resemble it, either Pueblo II or III or both.

The type of corrugated ware at Mesa House indicates that Mesa House is a later site than Lost City, except that some of the most northerly houses at Lost City were probably of the Mesa House period. These northerly houses contained the same type of corrugated ware as that found at Mesa House.

One interesting and significant fact appears in the connection with black-on-red ware at Mesa House: not only are black-on-red sherds, classified by Kidder as (Tusayan) Pueblo III, found there, but there is a potter's scraping and smoothing tool made from a sherd which apparently came from the same bowl from which Kidder's sherd was broken. Thus it would appear that there may have lived at Mesa House an individual who made pottery of the Tusayan type. On the other hand, all of the Tusayan black-on-red may have been brought to Mesa House and the potter's tool may have been made from a fragment of a shattered bowl.

In discussing certain of the sherds sent him, Roberts says: ". . . this and the other mica spotted sherds are puzzling to me. If I found them in the eastern part of the area I would list them as probably Apache. I am not sure, but it seems to me they possibly bear some relation to quite similar ones from southwestern Arizona and southern California."

These mica spotted sherds are indeed similar to a ware found in the sections mentioned by Roberts. Harrington in his report on his reconnaissance of the lower Moapa Valley, refers to such sherds as Colorado River ware, although this ware does not necessarily contain mica. As said before, this pottery represents 21 per cent of the plain ware at Mesa House. Judging from the rim fragments and from the shape of the sherds, the pieces are from large pots, although several bowl rims are in the lot. A projected circumference of one of these pot rims indicates a diameter at the mouth, outside measurement, of 13 inches. This rim was .2 inch thick. Several

of the sherds suggest the "hammer-and-anvil" method of manufacture.

This Colorado River ware had a wide distribution over the site. It was found in the following rooms, pits and ash-layers: Rooms 66, 60, 57, 67, 45, 59, 63, 9, 27, 32, 37, 47, 44, 50, 51, Pit 3, Ash-layers 1 and 2 and outside of Rooms 36, 22 and 23.

It was found in rooms filled with village refuse, such as Rooms 51, 59 and 45, and also in rooms filled with the debris of their own walls and roofs.

The explanation of the presence of this type of pottery is not known to the writer. It may have been brought in from the Mohave desert, its nearest source or it may have been made on the site by women from the Mohave tribes, who had found their way into the village group by marriage or capture.

The 32 fragments of black-on-white corrugated ware from Mesa House represent as nice a phase of the art of pottery making as is found there. The quality of the paste, the evenness of the corrugation and the general precision of the workmanship, are distinctively excellent. The interiors of these bowls (all of the fragments of this ware are from bowls) are slipped with white and painted with black lines. A search was made of all available reports on Pueblo sites in order to learn something of the distribution of this ware.

Harrington found it at Lost City, Nevada.²⁰ Judd²¹ found bowls with exterior coiling in Utah and says that they were used sparingly from Paragonah southward. Morris found it at Aztec Ruin: "A number of fragments and 3 more or less complete bowls represent a variant of black-on-white ware which combine the technique of both black-on-white and corrugated. Bowls seem to have been the only form."²² Noel Morss reports this ware from Middle Chinlee and shows a corrugated sherd with black-on-white interior decoration.²³

In a letter to the writer Dr. A. V. Kidder, in reply to an inquiry about this ware, says: "Black-on-white ware bowls with corrugated exterior are a rare sub-group in practically every region where black-on-white pottery is made. They occur in this way in the Mesa Verde culture, Chaco Canyon, Montezuma Creek and here at Pecos."

MISCELLANEOUS OBJECTS OF POTTERY AND CLAY

Several potsherds, chiefly black-on-white and black-on-red, had been made into tools for scraping and smoothing pottery (Fig. 13i

20. M. R. Harrington, *A Primitive Pueblo City in Nevada*, *Am. Anthr.* Vol. 29, No. 3, p. 270.

21. N. M. Judd, *Archaeological Observations North of the Rio Colorado*, *Bur. Am. Eth. Bull.* 82, p. 144.

22. E. H. Morris, *The Aztec Ruin*, *Anthr. Papers Am. Mus. Nat. Hist.*, Vol. XXVI, Pt. I, p. 74.

23. N. Morss, *Archaeological Explorations on the Middle Chinlee, 1925*, *Memoirs Am. Anthr. Assn.*, No. 34, 1927, p. 40.

and o). A number of sherds seemed to have been roughed-out for such use but not actually used.

A platter-like dish was made from a corrugated sherd. This is 7 inches across and 1 inch deep.

A small clay pipe (Fig. 13e and f), of the cigar-holder or tubular type, was found in the courtyard, near the side of Room 37. This is 2.1 inches long, of baked clay.

Several fragments of baked clay objects, possibly figurines, were found. One of these, shown in Fig. 13d was sent to Mr. Earl H. Morris. His comment was: The "protuberances resembling breasts suggest this to be a sort of figurine, but in form the object is like nothing I have previously seen." It is possibly that these figurines, if such they be, are a degenerated form of Basket Maker III figurines, of a sort which Harrington reports from Lost City.

A fragment of a small "thumb-pot" of unbaked clay, was found in Room 51. In it is a piece of vegetal matter, which may or may not be tempering material or "binder,"

A lump of potter's paste, thoroughly mixed, with tempering material included, and unbaked, was in the refuse which filled Room 51.

Several small, crudely shaped bits of baked clay were found in Room 51. These resembled somewhat small, thin handles such as are put on vessels; but this is doubtful and their significance is unknown to the writer.

PIGMENTS

Green. An abrading stone from Room 20 bears streaks of green. This suggests the use of some one or more of the copper salts as a source of green paint.

Red. In Room 19 was found the carapace of a desert tortoise, which contained lumps of hematite. The inside of the carapace was smeared with red, from the hematite.

White. Lumps of magnesite, a whitish mineral, were found in certain rooms. This may have been used for white paint, in decorating the body. Unless it contains certain iron oxides, which would cause it to take on a reddish color, this may have been used in making the white slip for black-on-white ware. In the Moapa Valley is a little settlement known as Kaolin, $4\frac{3}{4}$ miles south of Mesa House. West of Kaolin is a large sedimentary deposit of magnesium carbonate. Not a pure magnesite, it contains a relatively small percentage of impurities and there is a vast supply of it. It is reasonable to suppose that the Mesa House people obtained their magnesite from this deposit.

PETROGLYPHS

On the side of the mesa, 20 feet from the top and 126 feet northwest of the center of Room 79, a limestone boulder protruded from the gravel. On our way to and from work we made a trail just below this boulder. We had been told that somewhere on or about the mesa was a rock bearing petroglyphs and we were asked to search for it. We finally identified the boulder above our trail as the one in question.

It is irregular in shape; a strong man can scarcely lift it. As found by us, one edge and a part of one side were exposed. On the exposed surface were the pecked silhouettes of mountain sheep and human-like forms, typical of the rock-pictures throughout the country-side, attributed to Pueblo Indians.

The rock, which is of limestone, was manifestly *in situ* and had been deposited there by natural agencies and not by the hands of men. The writer concluded that the primitive artists who pecked the figures on it saw as much of its surface as we did, and no more. Only a small portion of the surface was used. There were other and larger facets, buried in the gravel of the mesa, which doubtless would have been used had they been exposed. The buried portion of the boulder was encrusted with lime and silt; the exposed part was weathered.

If we assume that the Mesa House group made the petroglyphs, and if our tentative dating of the ruin is at all correct, the condition of the boulder as we found it indicates that at this particular spot on the side of the mesa erosion had been virtually nil, for ten or twelve centuries.

Another point of interest in connection with the rock is that it lay just above our trail. We naturally sought out the easiest path to the ruin. Might not the people of Mesa House have found that the easiest path also? Of course, the petroglyphs may not have been made by the Mesa House group. We have no way of proving that they were. It was the only rock available for such purpose, so far as we know, for some distance.

SUMMARY

The ruin and the material culture of Mesa House have been described in the preceding pages. There remains the task of summarising and interpreting the data set forth.

Mesa House may be considered from three different angles: from the standpoint of the site itself, from the viewpoint of its relation to other sites in the Moapa Valley, and from the viewpoint of its relation to the Pueblo area as a whole.

The site itself lies on a mesa, 120 feet above the valley floor. Inasmuch as the arrangement of its houses and storage rooms in groups around a central courtyard suggests defensive purpose, it is assumed that the people who built the village had retreated to the mesa to get away from their enemies, who may have been the ancestors of the southern Paiute, who are now represented by a small number of persons living on the Moapa Indian reservation in the upper Valley.

Some of the houses and storage rooms definitely had walls of quasi-masonry, consisting of alternate layers of mud and undressed boulders. These houses were of one story and presumably roofed with thatch and mud. We know nothing of doors, windows or entrance-ways to houses. Surrounding the main group were semi-subterranean houses, suggestive of earth-lodges; among them were houses which had walls of adobe and stone.

There were three means of ingress and egress, in the chains of rooms surrounding the courtyard. These were narrow and easily defended. The ones on the northeast and southeast sides undoubtedly also served as outlets for rain-water which would certainly have accumulated in the courtyard in case of heavy rain.

No trace whatsoever of kivas or of any kiva-like structure was found. If any one or more of the rooms or houses was used for ceremonial purposes, no evidence was observed which would lead to the identification of such room or rooms.

Materials for house construction were near by. The boulders were obtained from the upper stratum of the mesa itself. The adobe was brought from the nearby knolls, eroded from the lower strata of the mesa. From such knolls also probably came clay for pottery.

The presence of corncobs and kernels of corn in the rooms and fire-pits indicates that the people of the site produced maize; arable lands for this purpose were no doubt within a mile of the mesa, at the time of its occupation. They also used the fruit of the mesquite, at least of the screw-bean type. At the present time a thicket of such trees grows just below the mesa, in the cove to the north; but we know that this thicket is but a few years old.

Paucity of animal bones in the refuse in the rooms indicates a sparing use of flesh for food, either because of habit or because of scarcity of game.

The only adult skull found by us was deformed and brachycephalic. This would be expected in a Pueblo site.

The arrowpoints found on the site are of the same form as those found on a late Basket Maker site by Roberts.²⁴ They are the

24. F. H. H. Roberts, Jr., Shabik'eschee Village, Bur. Am. Eth. Bull. 92, Pl. 28 1-r.

same in form as those found at Lost City and other Pueblo sites in the Moapa Valley. Numerically, in proportion to the number of rooms in the site, far more arrowpoints were found at Mesa House than at Lost City. This strengthens the idea of defense, at Mesa House.

The three metates found on the site are of the type found in pit house villages and in the late Basket Maker site reported on by Roberts. Similar metates were found at Lost City.

It is thus clear that Basket Maker III influence is shown in the Mesa House culture, in arrowpoints and metates.

Three per cent of the plain pottery from the site is Basket Maker III. A few of the sherds included in this classification are either Pueblo I or suggestive of it. The Basket Maker III, numerically few, may well have come from the apparently Basket Maker village site about 2000 feet north of the Mesa House.

Forty-five per cent of the corrugated pottery from the site is definitely Pueblo III in type. The remaining 55 per cent is either Pueblo II or Pueblo III. The black-on-white ware is apparently a mixture of Pueblo II and III and so is the black-on-red ware.

The type of architecture might well be classified as Pueblo II, so far as masonry and form and arrangement of houses and storage rooms are concerned. If the site contained but one of the strings or groups of rooms which surround the main courtyard or which make up the southwest wing, the writer would not hesitate to place the site in the latter part of the Pueblo II culture period.

The fact of the arrangement of 2 of these groups around a central courtyard, and the fact that a start had been made toward a second row of storage rooms built against the inside walls of the group, is so strongly suggestive of the quadrangular, multiple-room pueblos of the San Juan and other areas in the Great Period, that the writer is forced to conclude that culturally the Mesa House must be considered as early Pueblo III. This conclusion is supported by the pottery classifications.

Chronologically, on the basis of the most recent published results of the work of Dr. Douglass, based on his study of sun-spots and tree-rings, which show that Pueblo Bonito contained a timber which was cut in 919 A.D., the writer concludes that Mesa House probably was built and occupied sometime in the 8th or 9th century, A.D.²⁵

Viewing Mesa House in its relation to other Pueblo sites in the lower Moapa Valley, the writer's conclusion is that it represents the closing phase of the Pueblo occupation of the Valley. This conclusion is based on the fact that the pottery at Mesa House is of a later type than that at sites of the Lost City period, which are cultur-

25. A. E. Douglass, *The Secret of the Southwest Solved by Talkative Tree Rings*, *Natl. Geog. Mag.*, Vol. LVI, No. 6, p. 767.

ally placed in Pueblo II. Supporting evidence is found in the contrast between the location of Mesa House, on its relatively inaccessible mesa, and of the Lost City sites, which are on low-lying knowls or ridges between washes; and in the fact that Mesa House is built for defense, whereas the other, earlier sites consist of house-clusters built without regard to defensive arrangement.

If the question is asked, why did the Pueblos retreat to the mesa tops, in the Moapa Valley, after having been apparently so prosperous and peaceful on the lower lands, the answer is not difficult to find in the allegation of pressure from raiding nomads. Pressure from nomadic enemies has long been assigned as the reason for the abandonment of the peripheral sections of the Pueblo culture area. Kidder says:²⁶ "I stress here, as before, the influence of the nomadic enemy, for this appears to me best to explain the observed facts of Pueblo history. The same facts, however, may also be and indeed have been, explained with the theory of a progressive desiccation of the Southwest. During the discussion of the Chaco Canyon certain arguments opposed to the desiccation theory were presented, and these apply equally well to the situation in other parts of the area. Although the question is still an open one, the bulk of the evidence now available seems to me to indicate that so far back as the time of the Basket Makers the climate was much the same as it is today; and that aridity, comparable to that of the present, has from the very beginning been one of the most vital factors in shaping southwestern culture. I find it hard to believe in a progressive drying up of the country during the period of its occupancy by man."

It seems however, that there may have been certain minor changes in water-levels, throughout the Southwest, which did not involve a progressive desiccation of the area or any marked change in its climate. Throughout the Southwest, the Pueblos were dependent on agriculture for the bulk of their food and their agriculture depended on flood-water farming for the most part and in some districts on live-water irrigation. So long as seasonal floods occurred and so long as live water could be diverted from streams, the Pueblo population could remain stable or even increase; and under these conditions the raids of nomads could be endured, even if they could not be prevented by armed force. Diminution of flood-water or deepening of stream channels would tend to reduce population by diminishing food supply and forcing emigration; and the thinned-out ranks of the Pueblos would be more and more harassed by their enemies.

Evidence of two such minor changes in water supply have come to light recently. Dr. Kirk Bryan comments on the restriction or

26. A. V. Kidder, *An Introduction in the Study of Southwestern Archaeology*, New Haven, Yale Univ. Press, 1924, p. 127.

constriction of the Pueblo culture, which took place in the great period and calls attention to the fact that much of the agriculture throughout the area must have depended on farming by flood-water although at many places irrigation by living water was practiced. We quote Bryan.²⁷

"A cycle of erosion similar to that of the present, accompanied by trenching of stream channels, drainage of moist flats and great restriction in farming by flood-water, would have been an adequate cause for the abandonment of many previously occupied regions. It would have been most effective in the peripheral regions occupied by the Pueblos and may easily have been the cause that brought the Great Pueblo phase to an end."

The present cycle of erosion, referred to by Dr. Bryan, has been apparent in the lower Moapa Valley since soon after 1880, when, at a time of unusual floods, the river began to deepen its channel.

Bryan thinks such a condition would have been most effective in the peripheral regions; and Kidder says:²⁸ "There is reason to believe that the region north of the Colorado river was first given up, although some settlements evidently held out for a long time along the Grand Canyon and in the Virgin Valley."

Bryan further says:²⁹ "That such a cycle of erosion took place in prehistoric time and was succeeded by a period of alluviation that continued down to about 1880 is supported by an increasing body of fact. A buried channel representing such a cycle of erosion and alluviation has been found in Chaco Canyon and at other localities, notably on Rio Galisteo The channel formed and filled at about the end of the Great Pueblo period. The collection of data on this episode is still going on but it appears that an adequate physical cause for the decline in Pueblo culture from its beginning and the shift in population at about that time is in sight. Such an explanation rests on the postulate that flood-water farming was the principal support of the prehistoric people."

Flood-water farming could not, apparently, have been practiced in the Moapa Valley, because the Muddy River finds its source in several warm pools at its head and is not affected by mountain snows, so far as the writer knows. Since the rainfall throughout the drainage area is not over 6 inches per annum on the average and since such rain as does fall is irregular and is unevenly spread over the Valley, such things as seasonal floods do not exist.

So long as the Muddy River was a slow-moving, meandering stream, with shallow channel, a simple brush dam would be sufficient

27. K. Bryan, Flood Water Farming, Geographical Review, July, 1929, Vol. XIX, No. 3, p. 455.

28. A. V. Kidder, *op. cit.*, p. 126.

29. K. Bryan, *op. cit.*, p. 456.

to divert its waters and live-water irrigation would be entirely practical; but once it deepened its channel, the Pueblos would find it increasingly difficult and finally impossible or at least impractical, to turn water out of it. Thus it would appear reasonable to assume that in the Moapa Valley there took place, in late Pueblo II and early Pueblo III times, a progressive thinning out of the Pueblo population as village after village was abandoned and the people evacuated the valley. Meanwhile those who held on, and retreated to the mesas, would be able to oppose the nomads with less and less effectiveness and would eventually have to seek other territory.

The writer is informed that the southern Paiute in the Moapa Valley have a tradition that the builders of the pueblo villages in the Valley went to Arizona and were the ancestors of the modern Hopi. Kidder,³⁰ discussing the abandonment of the peripheral areas, says that Hopi and Zuni clan migration stories seem to indicate that both communities received increments from the north and south. Here at least is a matter for investigation in which the ethnologist may join the archaeologist in an attempted solution of the problem of where the Moapa Pueblos went after they left their Nevada home.

When we consider the Mesa House in relation to the rest of the great Pueblo area, we find that Kidder, writing of the San Juan cultural area, says: ". . . that the San Juan appears to have been the breeding ground for many of the basic traits of Southwestern culture and (the) center of dissemination."

Harrington has often told the writer that at Lost City he had gained the impression that the Pueblo culture of the Moapa Valley was influenced by that of the San Juan area.

Dr. Kidder found certain of the black-on-white sherds from Mesa House "a refined and specialized outgrowth of San Juan Pueblo II black-on-white."

Dr. Roberts in one black-on-white sherd found "many Little Colorado characteristics" and said of one, a black-on-red sherd, that it was "Pueblo III, suggestive of eastern Little Colorado, prior to appearance of black and white on red."

Thus there is some reason to suspect that the Pueblo culture in the Moapa Valley is related to that of the San Juan area, and perhaps also to the Little Colorado area.

Judd's archaeological investigations in Utah indicate a fairly widespread occupation by Pueblo culture; if the San Juan was the breeding ground of many of the basic traits of this culture, as Kidder suggests,³¹ there are apparently no insurmountable physiographic obstacles to the spread of the culture northward and eastward into

30. A. V. Kidder, *op. cit.*, p. 129.

31. A. V. Kidder, *op. cit.*, p. 126.

Utah and thence down the Virgin Valley into Nevada to the mouth of the Muddy and thence north up the Moapa Valley.

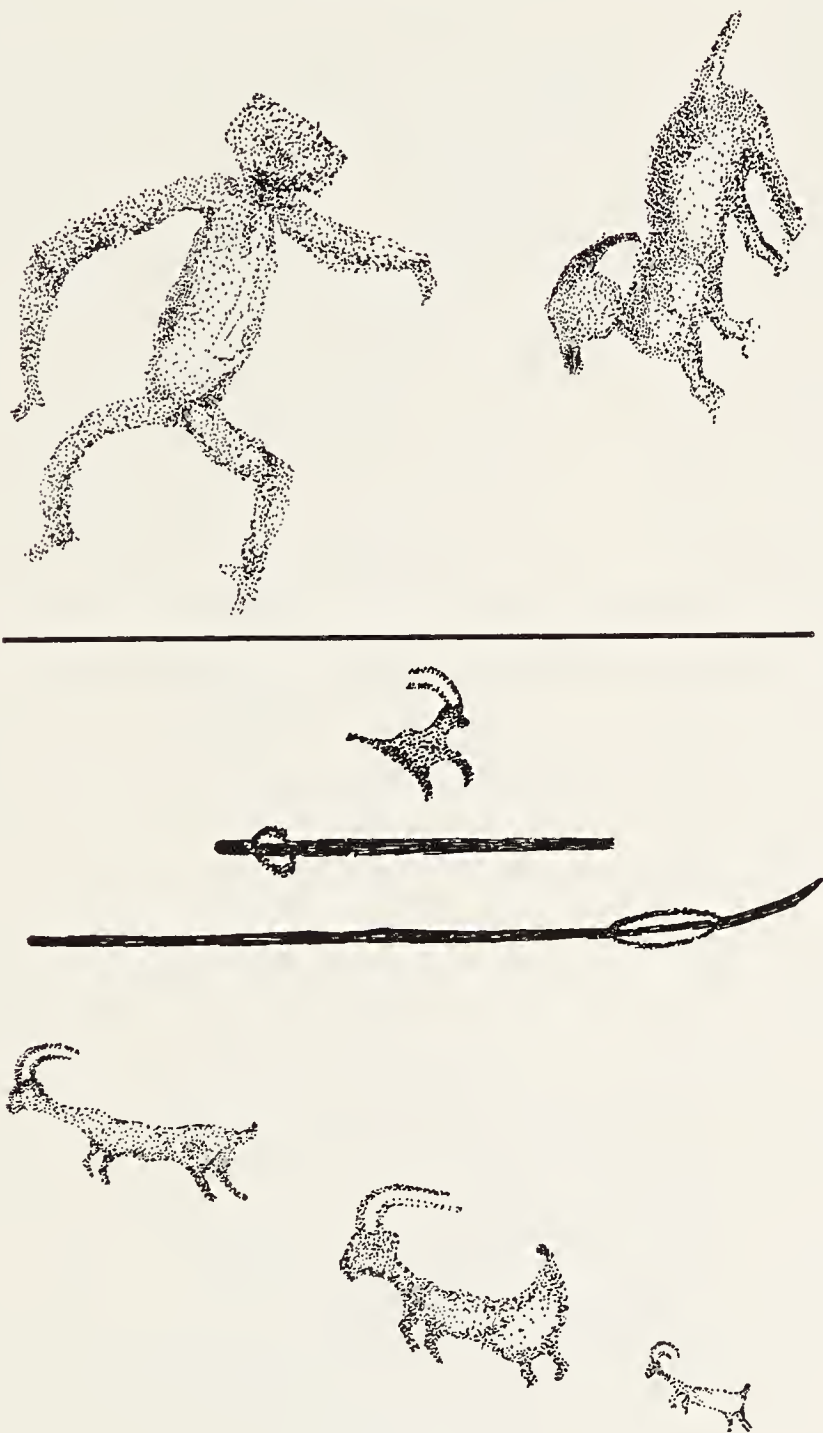
The movement of the San Juan culture could also have been from the San Juan Valley to the Little Colorado Valley, thence westward down the Colorado to the Virgin and from there up into the Moapa Valley. Perhaps the San Juan culture spread both ways.

It would seem entirely worth while to make a thorough comparative study of the results of the work done by Judd in Utah and in the area north of the Colorado, of Harrington's work in the Moapa Valley, including Mesa House, and of all work done in the San Juan and Little Colorado areas; and if in addition to this a complete reconnaissance of the terrains between the Little Colorado area and the Moapa Valley, and the country between the San Juan area and Utah, by the northern and western route, was made, a great deal might be learned about the movement of culture and of peoples and of the development of Pueblo culture as manifested in the northern peripheral area.

The northern and western and the southwestern limits of the northern peripheral section of the Pueblo area have not definitely been determined. Here is an important field for research.



Expedition Camp near Overton, Nevada



PECTOGRAPHS

Above—From Rock at Mesa House (see p. 82)

Below—From the Valley of Fire, 10 Miles West of Mesa House.

TABLE 1.
DETAILS OF ROOM CONSTRUCTION
MESA HOUSE, NEVADA

Room No.	Average Dimensions			Thick- ness of Base of Walls	Character of Base of Walls	Type of Floor	Depth of Floor Below Mesa Surface
	Length	Width	Diameter				
1	9' 3"	4' 3"	....	4 to 5"	Type 3 Plastered.....	1	....
2	7' 6"	3' 10"	....	7"	Type 3 Plastered.....	1	....
3	7' 8"	4' 7"	....	5 to 10"	Type 3 Plastered.....	1	....
4	4' 11"	4' 7"	....	4 to 10"	Types 2 and 3 Plastered	1	....
5	11' 0"	5' 0"	....	4 to 8"	Types 2 and 3 Plastered	1	....
6	3' 6"	3' 8"	....	4 to 6"	Type 1 Plastered.....	1	....
7	5' 6"	3' 8"	....	4 to 5"	Type 2 Plastered.....	1	....
8	5' 11"	4' 0"	....	4 to 5"	Type 2 Plastered.....	1	....
9	23' 3"	13' 0"	....	6 to 8"	Type 4	1	....
10	13' 8"	9' 0"	....	12"	Type 4 Plastered.....	1	....
11	4' 10"	2' 7"	....	4 to 5"	Type 3 Plastered.....	1	....
12	4' 0"	4' 0"	....	7"	Type 1 Plastered.....	1	....
13	4' 7"	4' 7"	....	5 to 6"	Type 3 Plastered.....	1	....
14	8' 4"	4' 0"	....	4 to 8"	Type 3 Plastered.....	1	....
15	5' 9"	5' 0"	....	3 to 7"	Type 3 Plastered.....	1	....
16	17' 10"	12' 5"	....	8 to 12"	Type 4 Plastered.....	1	....
17	4' 9"	3' 7"	....	3 to 5"	Type 3 Plastered.....	1	....
18	5' 11"	3' 9"	....	5"	Type 1	3	....
19	4' 2"	3' 3"	....	4 to 14"	Type 3 Plastered.....	1	....
20	4' 8"	3' 0"	....	3 to 6"	Type 3 Plastered.....	1	....
21	3' 8"	3' 2"	....	5"	Types 2 and 3 Plastered	?	....
22	9' 2"	3' 5"	....	4 to 5"	Types 2 and 3 Plastered	1	....
23	5' 1"	3' 7"	....	5"	Type 1 Small Plastered	1	....
24	6' 6"	4' 9"	....	7 to 8"	Types 1 and 3.....	3	....
25	5' 0"	3' 10"	....	3 to 5"	Type 3 Plastered.....	1	....
26	4' 2"	3' 7"	....	5"	Type 3 Plastered.....	1	....
27	5' 10"	3' 2"	....	5 to 7"	Type 3 Plastered.....	1	....
28	8' 0"	4' 1"	....	5 to 7"	Type 3 Plastered.....	1	....
29	6' 0"	4' 0"	....	6 to 8"	Type 2	2	....
30	5' 4"	4' 8"	....	4 to 6"	Type 3 Plastered.....	1	....
31	5' 10"	3' 5"	....	4 to 6"	Types 1 and 3 Plastered	1	....
32	11' 0"	5' 0"	....	4 to 12"	Type 4	1	....
33	3' 11"	4' 5"	....	4 to 14"	Type 3 Plastered.....	1	....
34	5' 1"	3' 6"	....	4 to 6"	Types 1 and 2 Plastered	1	....
35	3' 8"	3' 4"	....	5 to 8"	Types 1 and 3 Plastered	1	....
36	....	....	3' 7"	7"	Type 3 Plastered.....	1	....
37	11' 6"	6' 6"	....	6 to 12"	Type 4	1	....
38	5' 11"	3' 10"	....	5 to 6"	Types 1 and 3 Plastered	1	....

Room No.	Average Dimensions			Thick- ness of Base of Walls	Character of Base of Walls	Type of Floor	Depth of Floor Below Mesa Surface
40	....	....	4' 3"	7"	Type 4	..	12"
41	....	....	8' 6"	10 to 12"	Type 3 Plastered.....	..	8 to 12"
44	....	....	4' 0"	.....		..	28"
45	10' 0"	6' 6"	....	.....		..	6 to 9"
46	....	....	7' 3"	7"	Type 4 .....	..	....
47	....	....	6' 7"	8"	Type 3 Plastered.....	1	19"
48	....	....	10' 0"	.....		..	6"
49	....	....	8' 6"	.....		..	5 to 10"
50	....	....	5' 4"	.....		..	22"
51	....	....	9' 0"	.....		..	15 to 21"
53	7' 0"	3' 6"	....	.....		..	4 to 6"
54	10' 0"	6' 0"	....	.....		..	5"
55	7' 0"	3' 0"	....	.....		..	15 to 25"
56	....	....	9' 0"	6"	Type 4 .....	..	....
57	....	....	11' 0"	.....		..	8 to 13"
58	....	....	5' 7"	5"	Type 3 Plastered.....	1	14 to 18"
59	....	....	9' 9"	.....		1	16"
60	10' 0"	7' 0"	....	.....		..	8 to 14"
61	5' 6"	4' 3"	....	6"	Type 3 Plastered.....	1	....
62	18' 0"	9' 0"	....	.....		1	6"
63	24' 0"	9' 0"	....	.....		..	10 to 20"
64	7' 6"	6' 6"	....	6"	Type 3 Plastered.....	1	9 to 13"
65	....	....	5' 0"	.....		..	5"
66	12' 0"	9' 0"	....	.....		..	7"
67	10' 0"	9' 0"	....	.....		1	11"
68	10' 0"	6' 0"	....	.....		1	10 to 15"
69	3' 0"	2' 6"	....	4 to 5"	Type 3 Plastered.....	1	....
70	....	....	9' 0"	.....		..	....
71	5' 6"	3' 5"	....	4 to 5"	Type 3 Plastered.....	1	....
72	4' 5"	3' 2"	....	4 to 5"	Type 3 Plastered.....	1	....
73	4' 2"	3' 1"	....	4 to 5"	Type 3 Plastered.....	1	....
74	4' 0"	3' 0"	....	6"	Type 3 Plastered.....	1	....
75	....	....	2' 0"	4 to 8"	Type 3 Plastered.....	1	....
76	....	....	2' 0"	4 to 8"	Type 3 Plastered.....	1	....
77	....	....	2' 6"	5 to 8"	Type 3 Plastered.....	1	....
78	....	....	1' 6"	4 to 6"	Type 3 Plastered.....	1	....
79	5' 8"	4' 5"	....	4"	Type 3 Plastered.....	1	....
80	....	....	7' 3"	4"	Type 4 .....	..	....
81	7' 11"	6' 4"	....	5"	Type 4 .....	..	....
82	....	....	8' 6"	5"	Type 4 .....	..	....
83	2' 8"	2' 0"	....	4"	Type 1 .....	..	....
84	4' 0"	2' 6"	....	4"	Type 1 .....	..	....

TABLE 2.
DETAILS OF OUT-OF-DOOR FIRE-PITS

Pit No.	Shape	Width	Length	Average		Contents
				Diameter	Depth	
1	Round	.....	.....	21"	10"	Ashes, charcoal, corncobs.
2	Round	.....	.....	24"	14"	Ashes, charcoal.
3	Round (group of 3 pits)			24"	3"	Ashes, flint chips, potsherds.
				24"	6"	Potsherds.
				16"	7"	
4	Oval	36"	72"	.....	10"	1 fragment of arrowpoint, flint chips, potsherds, ashes.
5	Round	.....	.....	24"	5"	Ashes, charcoal, potsherds. Lined with fire-hardened sand.
6	Round	.....	.....	15"	5"	Ashes, charcoal.
7	Round	.....	.....	51"	10"	Ashes, charcoal.
8	Round	.....	.....	12"	4"	Ashes, charcoal.
9	Round	.....	.....	24"	5"	Ashes, charcoal.
10	Round	.....	.....	18"	8"	Ashes, charcoal.
11	Round	.....	.....	30"	8"	Ashes, charcoal.
12	Round	.....	.....	23"	6"	Ashes, charcoal.
13	Round	.....	.....	12"	5"	Ashes, charcoal.
14	Round	.....	.....	10"	5"	Ashes, charcoal.
15	Round	.....	.....	12"	12"	Ashes, charcoal.
16	Oval	24"	43"	.....	10"	Ashes, charcoal.
17	Round	.....	.....	20"	6"	Ashes, charcoal.
18	Oval	24"	34"	.....	8"	Ashes, charcoal.
19	Oval	18"	36"	.....	8"	Ashes, charcoal.
20	Round	.....	.....	24"	6"	Ashes, charcoal.
21	Rectang.	36"	42"	.....	5"	Ashes, gravel.
22	Round	.....	.....	12"	4"	Ashes, charcoal.
23	Round	.....	.....	24"	6"	Ashes, charcoal.
24	Round	.....	.....	36"	8"	Ashes, charcoal.
25	Oval	26"	30"	.....	6"	Ashes, potsherds, 1 bone awl.
26	Round	.....	.....	17"	4"	Ashes, gravel.
27a	Oval	12"	22"	.....	6"	Ashes, charcoal.
27b	Oval	12"	22"	.....	4"	Ashes, charcoal.
28	Oval	12"	16"	.....	7"	Ashes, charcoal.
29	Round	.....	.....	38"	12"	Ashes, charcoal, potsherds.
30	Round	.....	.....	32"	14"	Ashes, charcoal, boulders.
33	Oval	24"	36"	.....	6"	Ashes, charcoal, potsherds.
34	Round	.....	.....	12"	4"	Ashes, charcoal.
36	Round	.....	.....	30"	4"	1 arrowpoint, flint chips, ashes, charcoal.

AN UNUSUAL BURIAL
IN
MESA HOUSE RUIN
OVERTON, CLARK COUNTY,
NEVADA
1926

By LOUIS SCHELLBACH, 3RD
Photos and Drawings by the Author

Mesa House Ruin itself was discovered quite by accident, and following the rule that the interesting and unusual is encountered when least expected, this was the case also of a prehistoric burial uncovered in this ruin, found north of Overton, Clark County, Nevada.

Unusual it was because its general character seemed to differ from that of the average burials encountered in the same valley by the Museum of the American Indian, Heye Foundation Expedition, during its investigation of Pueblo Grande de Nevada.

Interesting it seemed because of the story told in the stratified material above it and the number of unique specimens interred with the remains of what proved to be a double burial, an adult and a child.

The writer being at liberty, at the close of the Museum expedition in the spring of 1926, he decided to make search for pottery specimens, in the few remaining days left, before leaving the vicinity.

Taking two Indians, Willis Evans and Leslie Sanchee, as companions an attempt was made to ford the Virgin River, east of camp, and visit a small house ruin located on its bank. Turned back by high water, due to the heavy rains of the previous day, a rock-shelter west of Kaolin became our next objective. Here we were also blocked by the heavy mud in the washes through which we would have to travel.

The next likely place would be Burial Hill north of the town of Overton, where the museum expedition had made a preliminary reconnaissance several months previous with excellent results.

About one and a half miles south of this objective a halt was made to investigate a mesa spur. Climbing to its top we were astonished to see before us the clearly visible outline of a house ruin on the level gravel surface of the mesa top. We afterward learned that the ruin had been reported to Mr. Harrington by Mr. Fay Perkins of Overton.

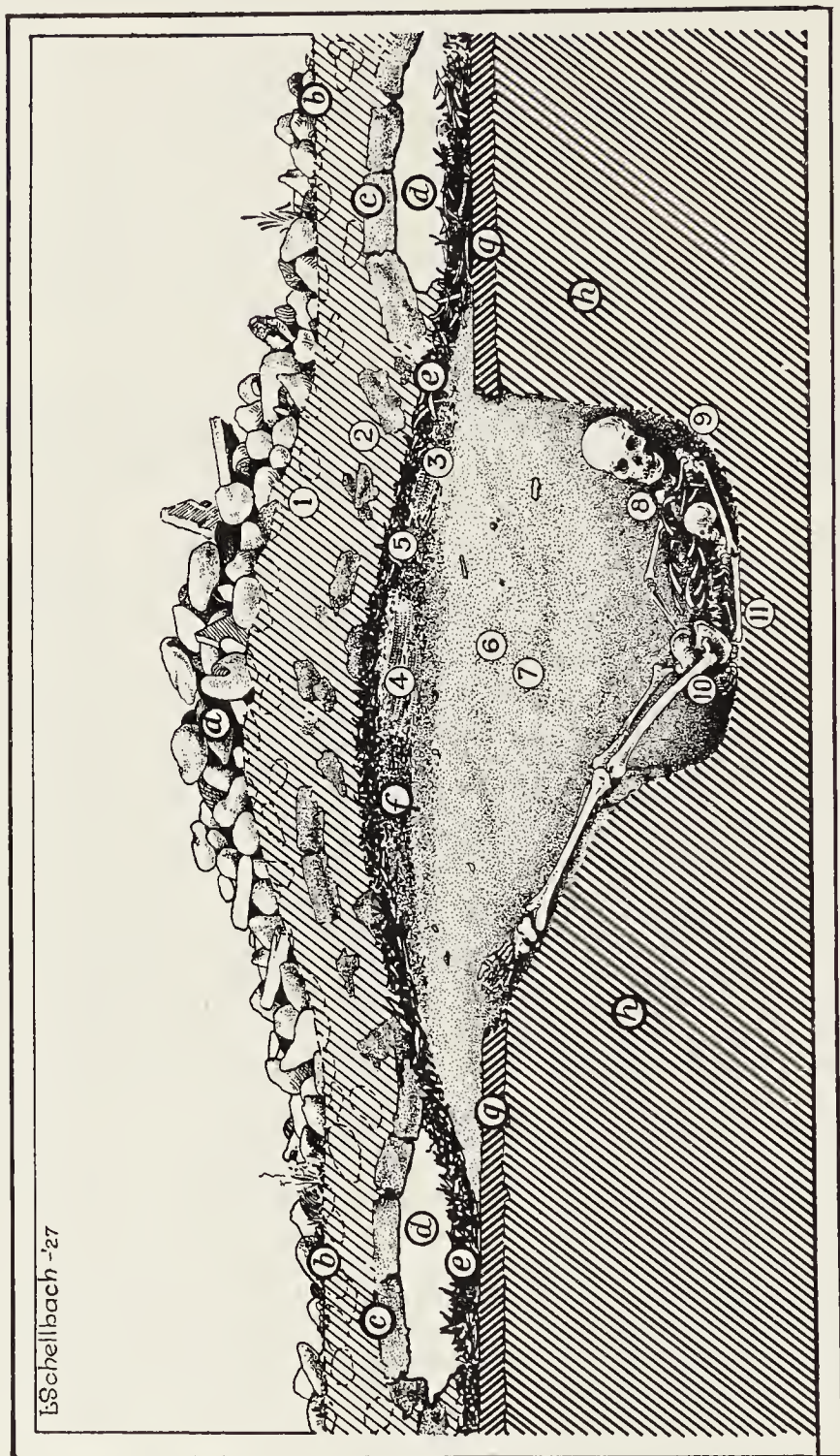


Fig. 1. Cross section sketch of Mesa House Burial. Letters show strata, figures location of artifacts.

This ruin held our attention and Burial Hill was forgotten.

A fragment of a large corrugated olla on edge was just visible between a pile of stones. The possibility of securing the rest of this olla for restoration now became the object of our search.

A preliminary test hole, at this spot, showed such an interesting state of affairs that the ruin was plotted and the place named "Mesa House."

This ruin was located on the level top of a narrow mesa spur jutting out into the Muddy Valley on the west side of the Muddy river, in the S.W. $\frac{1}{4}$ of the N.W. $\frac{1}{4}$ of Section 11, Township 16, South, Range 67 East, Mt. Diablo Meridian, Clark County, Nevada.

The surface of the mesa top was covered with water worn gravel and the only vegetation was an occasional creosote bush thriving where weaker desert plants fail. A hundred yards or more to the east, on this same mesa top, were several smaller house ruins.

The large stones that once entered into the construction of the adobe walls were plainly visible. Scoured by wind blown sand and washed by the occasional rains of many years they gave an excellent idea of the size and outline of the ruin.

The main part of the ruin was oval in shape with a break on the east side that may or may not have been the entrance to the central area. One small mound of stones, distinct from the main rim of this oval, lay just within the north rim.

The central area was evidently a court or plaza and sloped gently toward the center, making a shallow depression. This is no doubt due to the eroded wall material washed down about the court. Measured, magnetically, north and south this court was sixty-eight feet long and east and west measured fifty feet six inches wide.

Sparsely scattered over the surface gravel were stone flakes and chips, some fragments of pottery of straight corrugated, waved corrugated, black-on-gray, and red and plain ware. With the exception of the large corrugated fragment observed sticking from the stones, no large pottery fragments were visible on the surface.

Two circular ruins forming part of the main ruin were located on the east and west side respectively, while on the northwest side a smaller ruin, evidently a room, was visible.

On the south and east sides and separated from the main ruin by only a few yards were three distinct mounds of stone, possibly single room houses or storage rooms.

The mesa top was not very wide at the point of the ruin as shown by the lines of the mesa edge in the plan. However at a former time it must have been several feet wider if we take into account the erosion, not only on the ruined walls, but the mesa as well.

Operations were started at a point on the east side of the central

court, which proved later to be a room twenty-two and a half feet long by fifteen feet wide, the floor being one foot eight inches lower than the surrounding ground surface. It was in this room that the grave had been made which we are about to describe, called by us Room No. 1, Burial No. 1.

With a view toward assisting written description a sectional drawing of the burial is added in which the letters represent the different layers encountered and the numbers the location at which the different specimens were found (Fig. 1).

The surface indication of course, was the stones of the fallen walls lying on the surface and washed clean of the adobe in which they were once set (Fig. 1a). These stones formed a mound higher than the surrounding ground level (Fig. 1b).

Beneath this mound of stones the adobe also used in the walls was solidly cemented by the action of the first rains after the roof had fallen in and this became sealed by baking in the hot desert sun. This is one reason for the excellent preservation of the material interred. The whole mass acted as a roof from which the succeeding rains ran off on each side, while the sun baked adobe prevented any of the surface moisture from penetrating through to the objects beneath.

This first layer of stone, etc., contained many masses of adobe that had been acted upon by fire. The under sides were blackened and the earth reddish in color. These masses of adobe still retained the impression of the leaves and sticks upon which the mud had originally been spread (Fig. 1c).

Beneath this layer there was a distinct layer of course charred roof material (Fig. 1e) that covered the entire floor space of the room. This charred material did not lie level across the floor of the room. It rose gradually over a mound in the center of the floor. This mound later proved to be the filled-in material of a grave.

Around this central mound on the floor of the room there were spaces where the adobe roof material (Fig. 1c) had not completely fallen to the floor (Fig. 1d). Here the charred layer was not crushed and one could define the compact mass of leaf and brush upon which the roof mud had been spread.

Beneath this there was a layer of small charred sticks no larger than the thumb and fingers of the hand, resting at right angles upon charred beams, one of which measured six inches in diameter. Beneath this charcoal layer about the grave mound the hard packed adobe floor was encountered (Fig. 1g).

The roof had evidently been constructed of beams upon which, at right angles, lay the peeled sticks close together like the extended fingers of the hand. Upon this foundation a layer of leaves and brush was spread, followed by a coating of adobe mud, three to four inches

thick. The weight of this wet adobe pressed down upon and oozed in between the leaves and brush. When dry the hard mud held the impressions of the materials upon which it had been spread.

When the roof was fired and the supports gave way the whole mass crashed to the floor. The adobe roof covering pressed and lay on the burning material, quenching the flames. This prevented the wood from being completely consumed into fine ash and accounted for the charred condition of the material. At the same time the heat and flame acted upon the adobe, baking it into hard compact masses.

These layers (Fig. 1a, c, e) constituted the room debris in which were found fragments of turtle shell, a few bird and split mammal bones, four micaceous sherds of a plain olla, part of a clay doll and a fragment of pottery ground down for use as a smoother. Most of the fragments of the large corrugated olla were found in this debris (Fig. 1-1) and also a small stone knife blade, and a red sandstone gaming ball (Fig. 1-2).

On top of the grave mound there was all the evidence of a watch or sacrificial fire built prior to setting fire to the roof and destroying the room (Fig. 1f).

The clear evidence of this fire was one of the interesting features of this burial, and may perhaps be the only one recorded at this time, found in the Pueblo Grande de Nevada district.

The ashes of this fire were finer and contained a greater amount of gray ash than the heavy black charcoal layer of the roof material that lay above it. A distinct line of demarcation between the two was plainly visible. The earth of the grave mound also showed discoloration from heat and flame burning some time upon it to a depth of several inches.

Throughout the ashes of the fire were found quantities of charred seed (Fig. 1-4), parts of a coiled basket that had not been completely consumed, in which no doubt the seeds had been placed, fourteen charred bone gaming dice (Fig. 1-3 and 5), and a quantity of charred corn. Close by lay a grooved polishing stone about the size of a mano (Fig. 1-3).

Beneath the above layer of ash on the inner mound was the disturbed earth of the grave filling. It contained no hard lumps or masses of either wall or roof material, nor were there any large stones such as were used in the wall construction. This, too, would show that the grave had been excavated in the floor of the room prior to the room being destroyed.

The filled-in earth of the grave contained a pottery smoother made of pottery, eight arrow points and two remarkably fine antler clubs. (Fig. 1, 6 and 7). The clubs and some of the arrow points are shown *in situ* in Fig. 2.

The limits of the grave proper could be followed by the break

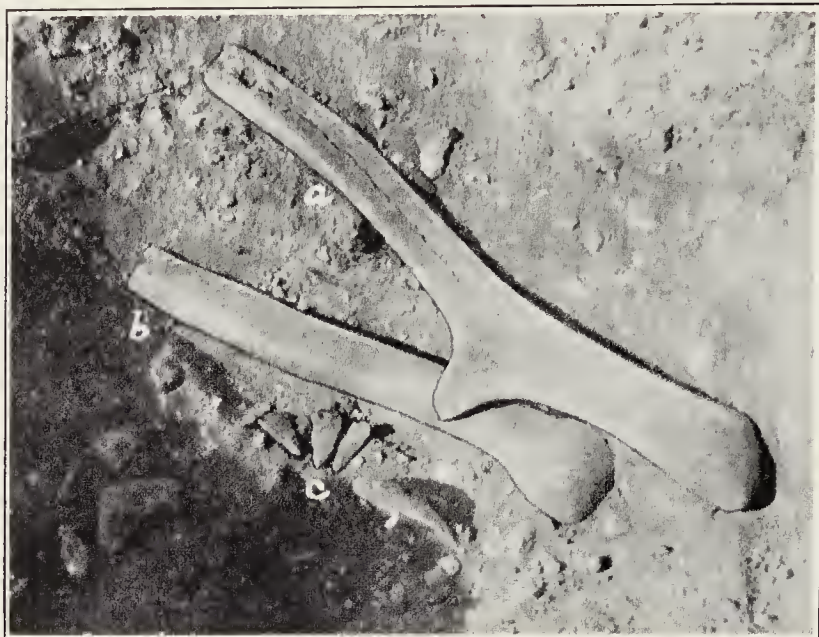


Fig. 2. Antler clubs in situ with three arrow heads, (a) reverse side of engraved fetish club, (b) plain club, (c) arrow heads.

in the adobe floor of the room. Below this there was a noticeable difference between the undisturbed earth that was hard and compact, and the loose filled in earth which showed the limits of the grave excavation.

One end of the grave opening had been enlarged to receive the lower limbs of the adult. Evidently *rigor mortis* prevented the flexing of the body for interment and an extra space was required that had not been foreseen.

The grave proper measured two feet eight inches, east and west and three feet six inches north and south. The extended skeleton of the adult lay southeast by northwest and measured on a line of the floor level five feet. The depth of the grave at a point beneath the pelvic bones was two feet.

The grave contained two skeletons, one probably an adult female and the other a child (Fig. 3). The child's skeleton lay on the left arm of the adult.

The adult skeleton lay on its back with the lower limbs upward and the knees extending out of the grave along the trench made to receive them. The toe bones were on a level with the adobe floor. The bones of the adult skeleton were in an excellent state of preservation.

The head was cramped forward and turned toward the left. The arms lay along the sides with the hands resting beneath the



Fig. 3. Burial No. 1, Mesa House Ruin. Parts of skull and bones of child on adult's left arm.

pelvic bones. The top of the skull was one foot one inch below the adobe floor level.

Over the left arm of the adult skeleton, in an extended position lay that of a child, the skull badly broken and the feet higher than the rest of the skeleton. The skull was one foot three inches below the adobe floor level. The bones of the child were in a poor state of preservation.

The child's teeth showed no wear and there were places in the jaw bone that disclosed the second set of teeth partly formed.

About the skeleton lay the different specimens. The arrow points at 8 and 9 (Fig. 1). Turquoise pendants and cane dice at 9. *Haliotis* shell pendants at 10. Hafted stone knife at 11 (shown in



Fig. 4. Hafted stone knife in situ.

situ in Fig. 4.) Remnants of textile, squash and mesquite seeds, pine nut shells and squash rind at 11.

Interpreting the above we would have a story somewhat as follows:

A woman and child had either died or were killed by enemies. Those assigned to prepare a burial decided on a room in the big house for the interment. Breaking through the hard packed adobe floor they excavated a hole two feet deep. Digging was hard work with their primitive wooden digging sticks in the compact gravel of the mesa top. The material had to be scooped up with their hands into baskets and piled on the floor of the room.

When the grave was finished it was found that the body of the adult had become so stiff that they could not flex it for interment in the place provided. This necessitated the gouging out of a shallow trench for the reception of the lower limbs from the knees down. The bodies were placed into the grave with the body of the child lying in the left arm of the adult, together with certain mortuary objects and the excavated earth replaced. Before completing the interment two clubs of antler and eight arrow points were placed in the grave and the rest of the earth replaced.

The grave was then carefully mounded and a fire kindled on the top. In this fire offerings of food and objects were placed and

the fire maintained for some time. When the time of maintaining this fire had lapsed, water from a large corrugated olla was thrown upon it and the olla shattered at that time. A torch was then applied to the dried roof material on the inside. As the roof supports gave away the whole roof with its covering of adobe crashed to the floor leaving the room in smouldering ruins.

As time went on the walls fell in and the occasional rains, assisted by the hot desert sun tended to preserve the tomb and soften the outline of the ruin.

The destroying of the room in which an interment was made was not in itself unusual in this district for Mr. M. R. Harrington encountered several such during his work on Pueblo Grande de Nevada.

The skeletal remains of the adult were carefully collected and sent to Dr. Bruno Oettking of the Museum of the American Indian, Heye Foundation, for examination and study. Dr. Oettking's report is now in press.

The bones of the child were badly broken and altogether too poor for study. Such as remained were carefully gathered together and re-interred.

The vegetal remains found associated with the burial were given to Dr. Melvin R. Gilmore for identification with the following report:

Charred seeds of the wild sunflower, found with charred basketry remains at 4 (Fig. 1) were *Helianthus annuus*.

Fragments of shell of squash of the small round type summer squash, *Cucurbita pepo*.

Fragment of shell of piñon nut found under backbone at 11 (Fig. 1) *Pinus* ?.

Seeds of summer squash found under backbone at 11 (Fig. 1) were of *Cucurbita pepo*.

Specimen numbered 15-3120 was undetermined. This is at present unknown to me, but it is so well preserved and well defined that with adequate comparative material from the living flora of the region it would not be at all difficult to determine. (This specimen lay at the right shoulder with arrow points at 8 (Fig. 1.)

Charred remains of a part of corn cob and of the stem of an ear of eight rowed small flint corn, apparently popcorn. Found at 3 (Fig. 1.)

Charred grains of corn are of the hard smooth type intermediate between the flint and dent types. This type is not so hard as the regular type flint, and the shape of the grains is not so smoothly round,—the shape approaches the pointed peg shape of the grains of dent corn. This intermediate type is cultivated at the present time by the Zuni Indians of New Mexico. Found at 3 (Fig. 1).

There was a scarcity of animal and bird bones about the burial

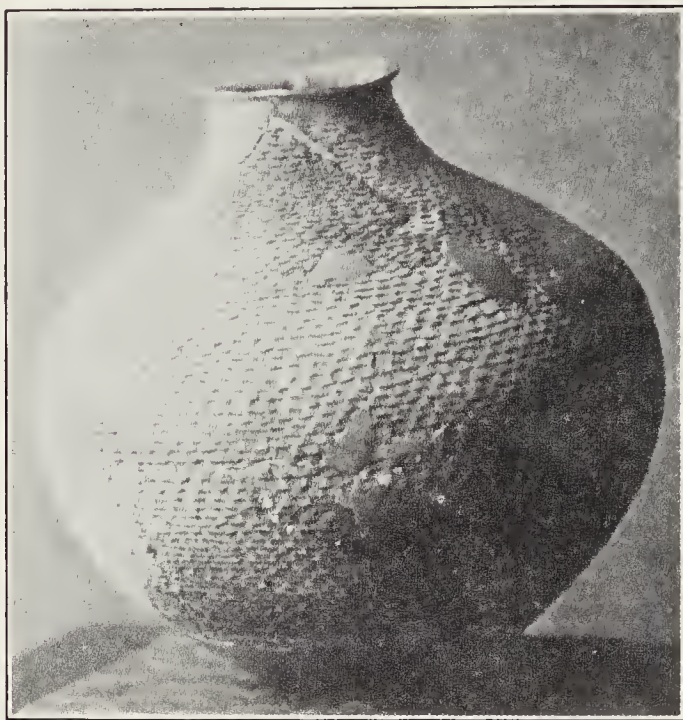


Fig. 5. Restored olla.

and room debris. Three specimens were of bird bones while the fourth was a small fragment of a long bone of some mammal.

Pottery has been mentioned before. It only remains for me to say that most of the fragments of the large corrugated olla were found closely associated with the heavy charcoal roof layer and some of these fragments showed the action of fire, while others that had been covered by the roof adobe were not. The restoration of this olla was not a difficult task and a picture of its reconstruction is shown in Fig. 5.

This olla measured sixteen and three quarters inches in height and sixteen and three quarters inches in diameter at the widest part. This widest part was located eight inches from the base line. The diameter of the neck opening was four and three-eighths inches, while the diameter of the rim was five and one-quarter inches.

This specimen is now in the Nevada State Collections at Reno, Nevada and is catalogued under the number 425.

Shell objects comprise two haliotis pendants, found lying under the left thigh bone at 10 (Fig. 1) and pieces of a turtle carapace, which perhaps was at one time a cup.

Fourteen bone gambling sticks all very much calcined were recovered from the ashes of the grave fire at 5 (Fig. 1).

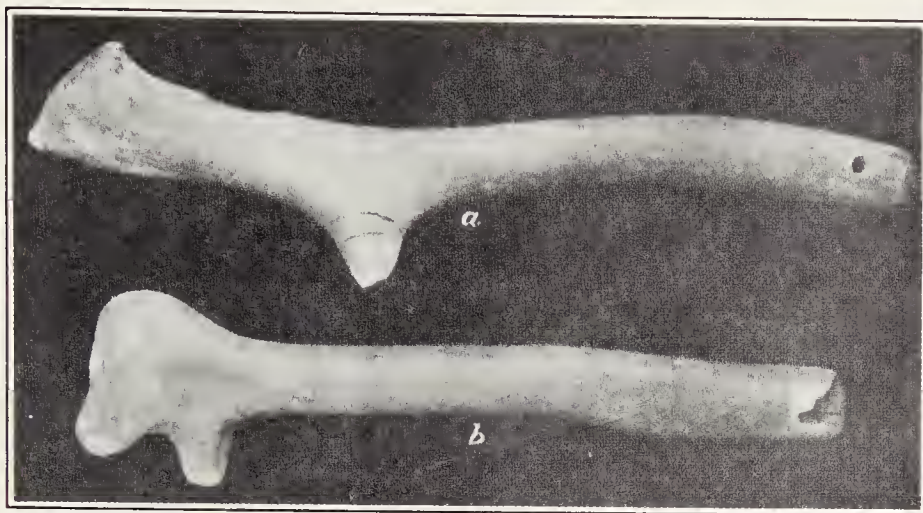


*Fig. 6. Antler clubs found with burial No. 2. Mesa House Ruin, Nevada.
(a) Fetish animal head and engraved spur, Length 19 $\frac{3}{4}$ ", (b) club head
double spur, plain drilled handle, length 16"*

Two cane gambling dice, one with marked surface were found at a point near the upper left shoulder.

Of the textiles, a few pieces of blanket wrapping and cord lay in the vicinity of 8 (Fig. 1).

In the ashes of the grave fire at 4 (Fig. 1) parts of a charred, plain coil basket were found with non-interlocking stitch technique.

Probably the most unique specimens uncovered were two well preserved antler clubs (Fig. 6). The larger measured nineteen and three-quarters inches long, and had the head worked into the semblance of an animal with eyes, ears and nose. The spur of this club was decorated with engraved lines and a series of dots. The end of the handle was drilled for the accommodation of a thong. The smaller club measured sixteen inches long, was plain as to decoration and it also had a hole drilled in the handle for a thong.

There were twenty-four arrow points associated with the burial (Fig. 7) all keen, fine points. They were found at the following points, one at the right shoulder, eleven at the back of the neck of the adult skeleton, two at the left shoulder, one at the right thigh, one at the spine, and eight with the antler clubs.

A pumice-stone polisher about the size of a hand grinding stone or mano, and much the same shape lay at 3 (Fig. 1) it also bore evidences of having been in direct contact with fire.

At 2 (Fig. 1) there was a small stone knife blade.

Twelve turquoise pendants were found altogether. Seven were under the right shoulder of the adult skeleton and five were found among the bones of the child's skeleton.

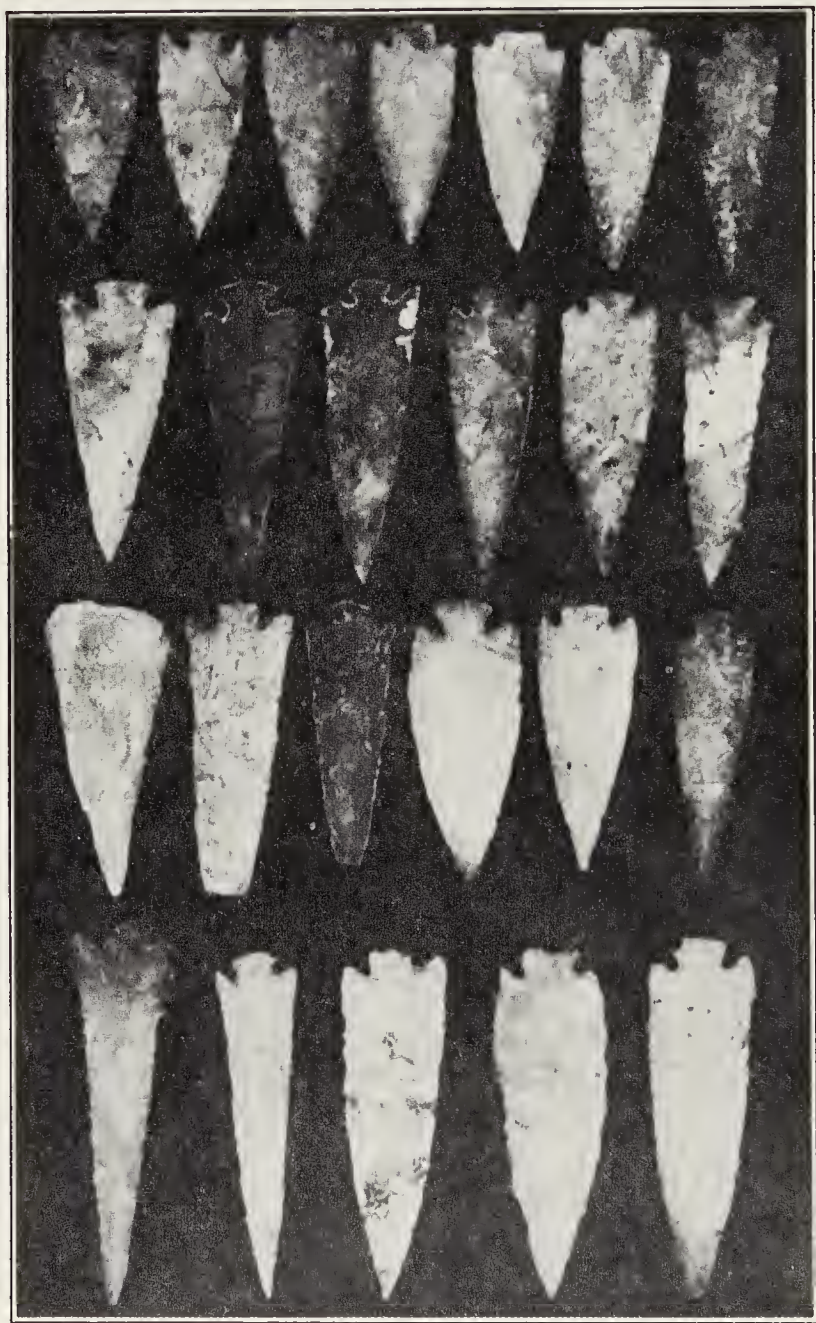


Fig. 7. Twenty-four arrow points with Burial No. 1, longest point $2\frac{3}{4}$ "

A fine specimen of stone knife with its original wooden handle still intact lay at the back of the spine of the adult skeleton (Fig. 8).

This room ruin and burial unfolded one of the finest cases of stratification it was the good fortune of the writer to have seen.

In conclusion, the writer is of the opinion that this house ruin and burial is of the last phase of Pueblo occupation in this area. This opinion is based upon the type of house ruin, which gives the evidence of a greater number of stones entering into its construction than the average type found throughout the district. Only a very few of a similar type had been found heretofore by Mr. M. R. Harrington on the opposite side of the Muddy River. This type at that time he called "stone house ruins." The position of these ruins on the gravel mesa tops also leads one to believe that the people abandoned the open lower river benches for better protection against their enemies. If things and times were peaceful they would not build their houses so high up and so far from water. It seems that only after trouble began in the neighborhood, and families moved off, that the few remaining, who were more courageous, took to the mesa tops to build their homes, hanging on to the last, until depleted by natural deaths and murder the last ones gave up the struggle and moved on to other parts.

The excellent state of the adult skeleton would also tend to show that it was one of the later burials in the district. On the articular parts of the large joints traces of cartilaginous stain were still present. Dr. Oettinger's report will no doubt bring out this feature.

It is possible that Mr. M. R. Harrington who is completing the exploration of Mesa House will have further evidence to bring to bear upon this opinion and the writer believes that the report will be of interest to students of the Southwest, for no doubt Mr. Harrington will have uncovered some interesting stratigraphic evidence.

It is hoped that this description of Burial No. 1, Room No. 1 will be of help in making the report of Mesa House Ruin complete. The work was carefully carried on and sketches and photographs made in the field.



Fig. 8. Stone knife and original wood handle, 8½" long.

PAIUTE CAVE

By M. R. Harrington

INTRODUCTION

Besides our two major projects, the Survey of the Lower Moapa Valley and the excavation of the Mesa House Ruin, the Southwest Museum Archaeological Expedition for 1929 finished a third project, a minor one. This was the exploration of a small cavern known as Paiute Cave, near Overton, Nevada, listed on our survey map as Site 43.

The results in the way of specimens were not especially unusual, although some interesting things were found. Yet the work was well worth while, and yielded information of real value in reconstructing our picture of the western frontier of the ancient Pueblo Indian domain,—information that had not been obtained elsewhere.

One helpful feature was the clear cut character of the strata in the cave. On the bottom lay a deposit left by the Early Pueblo Indians, the first inhabitants; on top, forming the cave floor, was a deposit left by the last inhabitants, the Paiute Indians. These two deposits were separated by a thick hard stratum of dried mud, which prevented any mixing of objects made by the two peoples, except in one spot where there was a test-hole sunk by previous diggers.

The story of the successive occupations as shown by the layers was so beautifully clear, that Harry Carr, the writer, who visited the cave while the work was going on, called it "the show window of American Archaeology."

The cave was dry enough to preserve corn-cobs, husks, etc., and here for the first time, thanks to the dividing layer of clay, we were able to state definitely which cobs were Early Pueblo and which Paiute.

Another unusual feature was the presence of laminae over and between the layers near the cave mouth which enabled us to work out a sort of rough time scale for dating the deposits.

SITUATION OF CAVE

About a mile and a half south of Overton, Nevada, a large arroyo known as the Magnesite Wash enters the Moapa Valley from the west, coming from the general direction of the Valley of Fire, and receiving its name from certain white deposits variously called "kaolin" and "magnesite" in the vicinity.

Traces of ancient habitations are rare about the mouth of this wash; in fact, we found none nearer than a Paiute camp site near Kaolin village about three-quarters of a mile to the southeast (Site



Fig. 1. Entrance to Paiute Cave as found.

42), and an early Pueblo house group about a mile away toward the north (Site 44).

Yet about a mile back up the wash from the Valley, (fully 1.6 mile from the highway) is this little cave that showed considerable use by both peoples. The cave could be easily overlooked by anyone travelling up the main wash, for it lies hidden fully a hundred feet back up a gully among the eroded clay hills which here fringe the wash on the north.

Additional concealment is afforded by a sort of natural dam which partly blocks the mouth of the gully, and at one time was probably high enough to hide the cave mouth. To-day the drainage of the gully (when it happens to rain) flows out through a hole under the base of this dam, but there is reason to believe that there have been times when this hole became temporarily blocked, as will appear later.

DISCOVERY

It was in 1925 or 1926 when this cave was first reported by Mr. Fay Perkins of Overton, Nevada, to the writer, who was then exploring Pueblo Grande de Nevada on the opposite side of the Valley, with the result that a party was sent to look the place over.

They found a small, but very dry cave, in which their test-pits, (one of which unfortunately penetrated the Pueblo layer), although sunk to the depth of two or three feet, failed to strike the bottom of the Indian refuse, such as dry grass, charcoal, ashes, corn-cobs, short lengths of native twine, and other indications of occupation.

The basketry was, in the main, distinctly Paiute in character, and for this reason the name of Paiute Cave was given the site. The depth of the dry deposits and their apparent richness led me to list it for exploration later; but the opportunity did not come until I returned to the Moapa Valley in 1929, this time in charge of an expedition for the Southwest Museum.

EXPLORATION

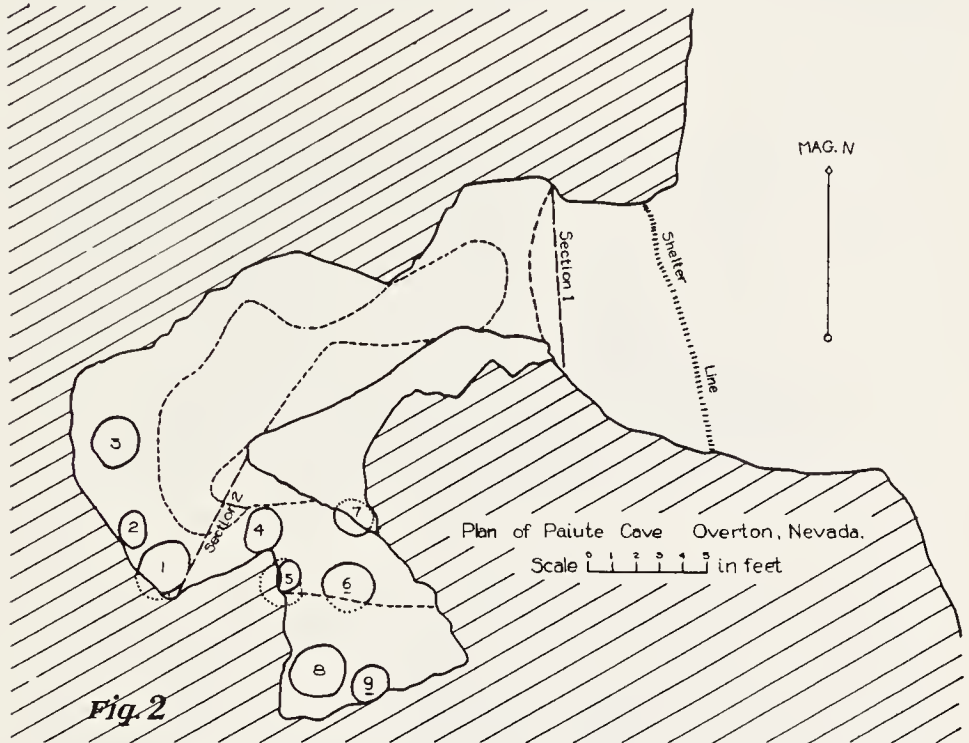
When James Scrugham, Jr., and I arrived on the spot, we found the entrance nearly blocked by a mass of clay silt washed down from the hill by the infrequent rains (Fig. 1.). Crawling over this we found ourselves in a low L-shaped cave, extending westward back 26 feet into the hill, the floor dipping downward, until the turn of the "L" was reached. Here it became fairly level, even rising a little toward the end of the arm of the L, which turned sharply to the left and extended 8 feet south from the main passage. The general form may be seen in the plan (Fig. 2). The cave was distinctly dark and decidedly dusty, but with our carbide lamps we could see that the walls and ceiling were composed of horizontal layers of indurated clay and soft sandstone.

Probably it had begun as an underground watercourse which, slowly enlarging as time went on, through falls from above which were gradually washed away, finally became the cave as we see it today. The falling down and washing out process might have continued of course until the whole hill became gutted and finally collapsed, had not the erosion been halted by the harder strata of rock which now form the cave roof.

When we began to dig through the clay silt which blocked the entrance, we found an interesting condition. Every rain had apparently washed down a thin layer or lamina of clay from the hill into the mouth of the cave, where it had dried, until a deposit had been built consisting of beds of Indian refuse divided and covered by these laminae to the depth of about seven feet.

It occurred to us that we might be able to establish some sort

of a chronology by means of these laminae, of which we found there were about fifty-six to the inch on an average of a number of inches selected at random. It was obvious, of course, that if we could find out how many rains heavy enough to wash down clay take place in a year, on the average, we could find approximately how many years each inch of lamination represented.



So we measured all our layers very carefully as we dug down through the deposit blocking the cave-mouth. Fortunately the test holes had been farther back, and our strata were undisturbed. The results of our calculations will be given farther on in this paper in the paragraphs headed "Conclusions."

The general arrangement of the layers containing traces of man, the mud layers and those made up of clay laminae may be seen in the Section, Fig. 3.

The laminae thinned out as we worked our way back into the cave, and finally disappeared, allowing the relic-bearing layers they had separated to run together until they finally resolved themselves into the three clear-cut deposits mentioned in the introduction.

The upper, or Paiute deposit, proved on inspection to be composed of two parts: the first, forming the cave floor, almost pure dust with broken baskets, etc., in an excellent state of preservation

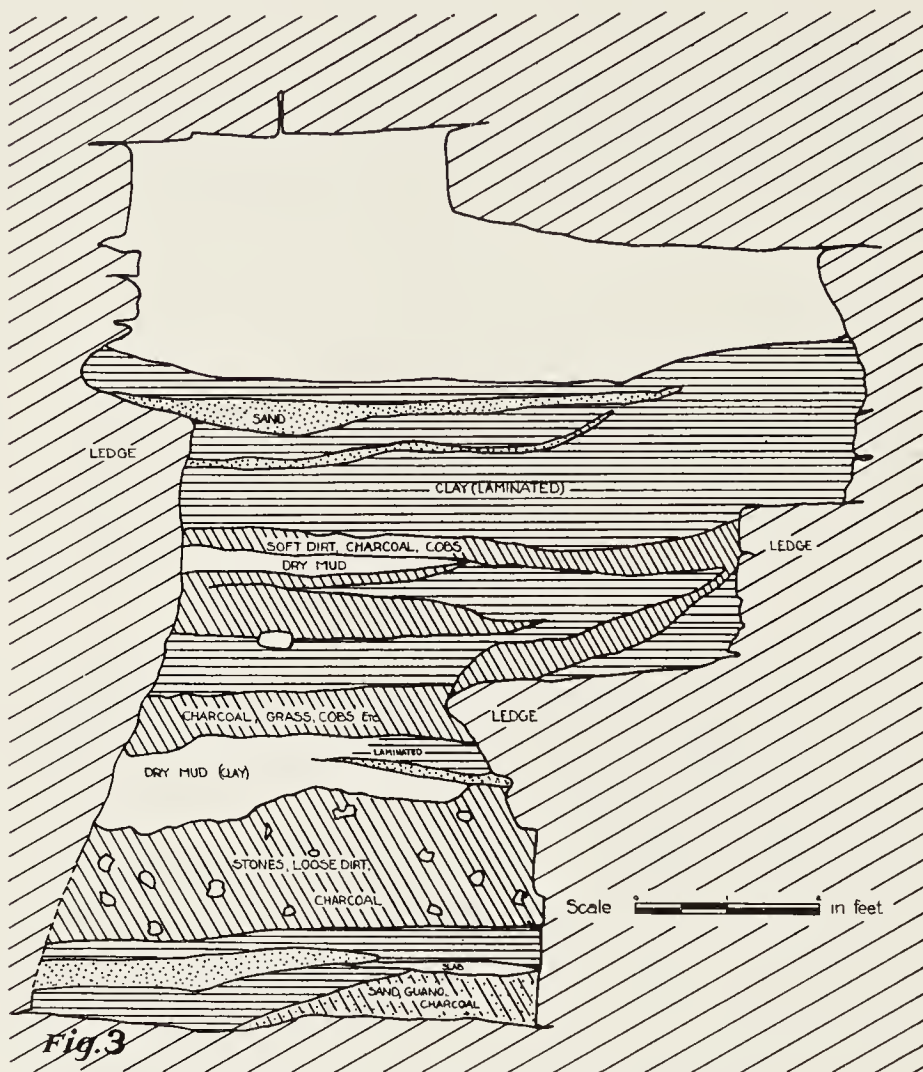


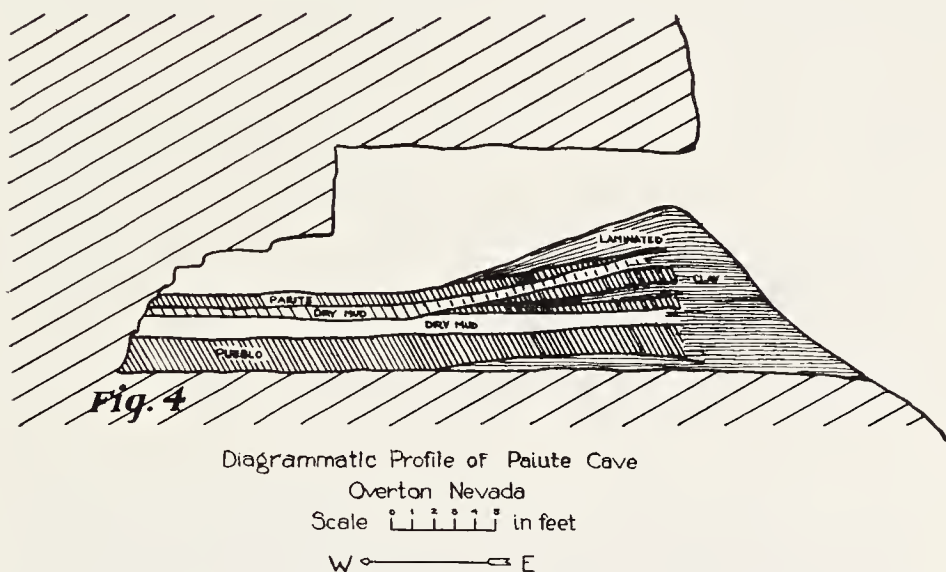
Fig. 3
Cross Section #1 Paiute Cave Overton, Nevada
about 4 ft. from entrance

and beneath this, the upper layer of dried mud, containing similar articles partially decayed.

Below this was the barren mud deposit almost as hard as concrete, and beneath this again the Pueblo deposit which was very dusty and dry except at the very top where the clay had evidently slightly moistened it when it, in the form of a stream of mud, had flowed in from outside.

That is to say the two upper sand layers and the layer labelled on the section "soft dirt, charcoal, cobs," ran together forming what we later described as the "upper Paiute Layer," while the "upper

dry mud layer" combined with refuse layers down to the heavy clay deposit, forming the "lower Paiute layer," which in the back of the cave, showed artifacts imbedded in dry mud. It was rather hard to trace these layers because they had received the brunt of the digging done by previous visitors. The heavy clay deposit (the lower dry mud layer), however, extended continuously to the back of the cave except in one spot where it was broken by a test hole, and everything below it combined to form our "Pueblo layer." This is shown in the profile, Fig. 4.



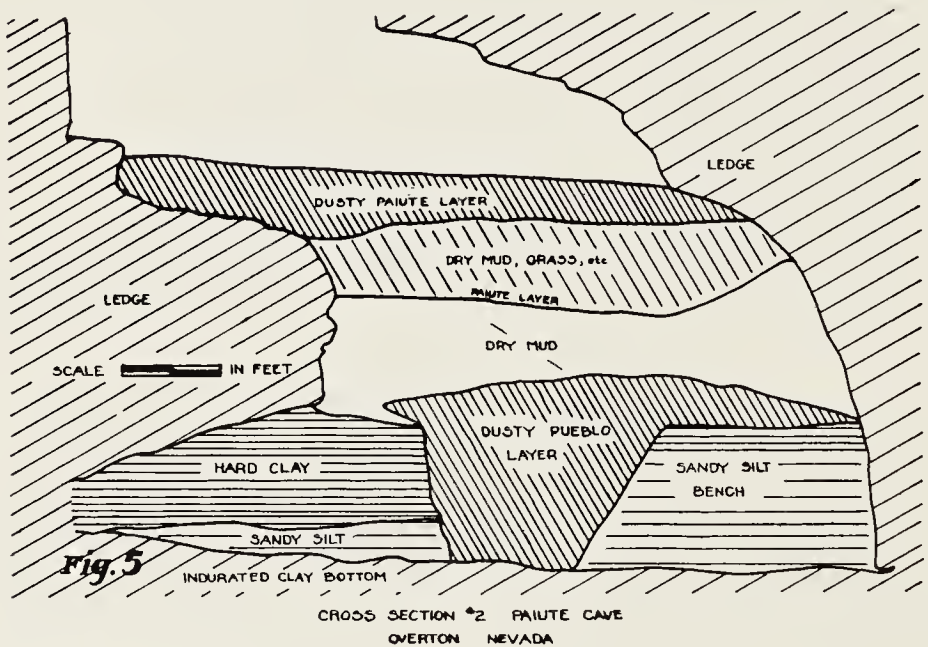
Most of the test holes which we, with some bitterness, termed "pest holes" on account of the mess they had made of the layers, fortunately failed to penetrate the heavy clay deposit so that our Pueblo layer was undisturbed except in the one place where some unusually enthusiastic tester had broken through its protective covering.

We did not, however, find it easy digging even below the clay, in spite of freedom from disturbance, for the bottom of the cave was spanned, just beyond the point where we made our section, by a natural sandstone bridge, formed by a ledge which continued around the sides of the main chamber in the form of a bench. The bridge was about 16 in. wide in the middle, and lay about 3 ft. below the surface.

Although the cave floor, as we found it, sloped sharply downward from front to back, the original rock-bottom remained at about the same level throughout the main chamber. Thus it was that while the total depth of deposits where the first section was taken

had been 7 ft. the floor sloped backward so rapidly that at 12 ft. from the first section the depth was only 4 ft. and this remained the average for the deeper portions, although on account of the natural sandstone benches on both sides even this depth was found only in the middle.

In the very back of the cave the benches still remained, but here, the true sandstone gave place to rather compact sandy silt and clay, as may be seen in the second section, (Fig. 5) which was made just at the point where the cave turned to the left. The sandy silt was ideal for the digging of storage pits, being not too hard to dig with considerable ease, but just hard enough for the walls to keep their shape without crumbling.



THE PITS

There were seven of these pits in the sandy silt bench, as may be seen in the plan of the cave (Fig. 2), all of them originating in the Pueblo layer. The dried river of mud lay unbroken above them. Their contents showed them to be of Pueblo origin, if any farther proof were necessary, for most of them contained typical Pueblo pottery (Fig. 6), of which the most characteristic were black-on-gray (A, C, D) and corrugated (B) sherds. On the other hand, Paiute pottery and the wicker-work and twined basketry usually found in deposits left by this people were conspicuous by their absence.



Fig. 6. Pueblo pottery from Paiute Cave.

Depths of these pits ranged from 16 in. to 23 in. calculating from the original level, the floor of the cave when made; although from the present floor the depths ran from 50 in. to 66 in. Their appearance when uncovered may be seen in Fig. 7.

One pit had been dug down only 9 inches into the bench, and this had evidently been open when the river of mud struck the place, for the mud had flowed into it and filled it.

The mouths of the pits were generally oval in form, and ran in size from 10 in. by 14 in. up to 30 in. by 39 in. Sometimes the pits were pot-shaped, the bottom being considerably larger than the top. For instance the pit with the small oval mouth, 10 in. by 14 in., had a circular bottom two feet in diameter.



Fig. 7. Storage pits in Paiute Cave.

Most of them seem to have been lined with grass or brush to keep the contents from actual contact with the ground; in one instance there was a two-inch layer of such grass.

Next to broken pottery the most abundant finds in the dusty filling of the pits were corn-husks tied together in pairs (Fig. 8a). Very likely the ears had been tied this way to hang across a pole for drying; then were carried to the cave for storage. Indian hemp stalks were also common; these, of course, were simply the refuse of string-making that had fallen into the pits by accident, as had also various corn-cobs, a rabbit bone or two, strings from a fur blanket, Fig. 9a, a cord made from human hair, Fig. 9b, a flint chip, some chunks of firewood and various odds and ends.

The situation of the various pits may be seen in our plan of the cave (Fig. 2) and any one interested in the details of their dimensions and contents will find them in a table at the close of this report.

The deep deposit of the cave continued into the south chamber only five or six feet; here a perpendicular ledge of sandstone was discovered rising from the bottom up to within 8 in. or 10 inches of the present cave floor. These eight or ten inches on top of the ledge were almost pure dust with imbedded Paiute objects; and the excavation of this deposit finished the cave except for two more pits which had been excavated in the solid sandstone shelf.

One of these pits was 30 inches in diameter, dug $5\frac{1}{2}$ inches into the sandstone; the other, 22 inches in diameter and cut 7 inches into the rock. The first had been disturbed, but still yielded Paiute basketry fragments; the second was complete, with a lining about $1\frac{1}{2}$ inches thick of grass, cornhusks and cobs. Both had been last used by the Paiute, but whether they had made them, or simply used pits left over from Pueblo days is a question. Situated on a high rock ledge they had not become buried in refuse as did the pits on the low bench in the bottom of the cave, until the deposit had built up to them, which was not until Paiute days.

THE SPECIMENS—PUEBLO

All the potsherds found in Paiute Cave, 53 in number were of Pueblo origin. Most of them came directly from the Pueblo layer, but a few were found in the mixed refuse where a "test-hole" had garbled the record. 9 of them can be classified as "black-on-white," 7 as "corrugated" and 37 as "plain" ware. There was no "black-on-red."

Taking up the black-on-white in detail, all were bowl fragments, 4 sherds were of grayish ware with a white slip upon which designs had been painted with broad, solid black lines, always upon the inside of the bowl. One of the four showed zig-zag design, the

others, parts of a design in which the broad black lines formed right angles (Fig. 6c). The paste was fine and hard, the tempering not in evidence, the cleavage straight and sharp. Outside, the surface of these bowls had been rather irregular, yet polished; inside the finish was smooth, with a good polish. A fifth sherd of similar ware had been burned so black as to nearly obliterate the design. A sixth was similar in decoration, but thinner and not so well finished. A pinkish cast on the outside suggested the one-time presence of "fugitive-red," a red paint applied after firing. This sherd had been cut to rudely circular form (about $1\frac{7}{8}$ " in diameter) to make a patch for mending something, probably another vessel, to which it had been fastened with pitch, traces of which still remain on the edges (Fig. 6d). All the preceding are typical "Lost City" ware. The remaining 3 sherds were similar in paste to the first group, but there was no polish and no slip, the black designs being applied directly to the carefully smoothed gray inner surface of the bowl. The black strokes were not as solid in color as the others.

Turning to the corrugated pottery, we find all our sherds dark-brown in color, coarse in texture, with the corrugations roughly waved by way of decoration (Fig. 6b). Two of the sherds (including the one illustrated) were smeared with pitch on one edge as if used to apply pitch to something. One sherd showed the corrugations partially smoothed over as in the variety known as "Blind corrugated," still without being typical.

The plain ware was mostly from the rather crude dark-brown cooking pots typical of the "Lost City" phase, but there were two pieces of the finer gray ware such as was used for bowls in this time. One may have been a bowl-fragment, the other was certainly from a small gray pot once smeared on the outside with "fugitive red." There was one piece of the reddish rather sandy pottery we distinguished as "Colorado River ware." This showed cutting on one edge as if it had been part of a patch or a potter's scraper, and was smeared on one side with pitch.

The use of pitch for the repair of pottery, which may be inferred from the carefully cut patch with the pitch around the edges has not been noted before in the Moapa Valley. Of course, such patched vessels would not stand heat, and could be used only for the storage of water, cold food, seeds and the like.

Outside of the potsherds just described artifacts were scarce in our Pueblo layer, consisting merely of a flint chip or so, a few pieces of native twine, some strips of twisted skin from a fur-cloth blanket, two buckskin thongs and the imprints on clay of a fine-woven coiled basket.

Three pieces of twine are of Indian hemp (*Apocynum*) and run from $1/16$ to $1/8$ in. in diameter. All are two-strand, and two



Fig. 8. (a) Corn husks tied together—Pueblo layer, (b) Piece of net, Paiute layer.

of the three pieces show a counter-clockwise twist, while one, the finest, is twisted clock-wise. A fourth piece of twine is made of hair, apparently human, and dark-brown in color. It is two-strand, with a clock-wise twist (Fig. 9a). The strings from the fur-cloth blankets are interesting in that the strips of fur have been made into a two-strand, clockwise twist without the foundation cord, so often seen. So little fur was left that the species of animal yielding it could not be determined.

The basketry imprints (Fig. 10b) showed a coiled weave of about six coils to the inch vertically and 16 to 17 stitches to the inch horizontally, very smoothly and evenly done. Of course, nothing could be told of material or decoration.

There were no other artifacts, unless we include some strips of bark, unidentified, knotted together; a mass of coarse fiber apparently the remains of some ancient Pueblo's quid or chew of cooked mescal, and a number of corn-husks knotted together in pairs.

This brings us to the question of corn from the Pueblo layer. There was one grain found, red in color and apparently of the variety known as "starch-corn" still raised by the southwestern

Indians. Cobs were numerous, but mainly fragmentary. The three almost entire examples measured respectively $3\frac{1}{4}$ in., $4\frac{7}{8}$ in. and 5 in. Of 19 specimens selected at random, 4 showed 8 rows; 6, 10 rows; 6, 12 rows and 3, 14 rows. According to Mr. James B. McNair of the Field Museum in Chicago, who identified the specimens, these cobs might all represent one horticultural variety of corn, either "starch" or "flint," but could not be "sweet," "pop," or "dent."

Some shreds of juniper bark, bits of corn-stalk, a few Indian hemp (*apocynum*) stalks; pieces of arrow-cane (*Phragmites communis Trin.*), fragments of charred firewood from local desert shrubs twigs of the creosote bush (*Larrea sp.*) and bunches of grass complete the series of plant specimens from the Pueblo layer of Paiute Cave.

Animal bones comprised fragments of the shell of the desert



Fig. 9. (a) Cord made of human hair—Pueblo layer, (b-c) Strings from fur cloth blanket, (d) bow string.

tortoise and a few small broken specimens possibly from jackrabbit or cottontail.

Three crystals of selenite, although evidently unworked, had probably been brought to the cave by man.

PAIUTE SPECIMENS

No pottery of Paiute manufacture was found in Paiute Cave, although the collection from the Paiute deposit as a whole was much more varied than that found in the Pueblo layer.

The lack of pottery was made up for in basketry however. This occurred in two main types, twined and coiled. All seem to have been made of willow, both split stems and whole stems appearing. The twined weaving was again subdivided into two classes, openwork twining and close twining. A typical specimen of the former showed five vertical elements or warp-strands, consisting of whole willow twigs, to the inch; with the horizontal twined elements—split willow twigs—running in pairs, each pair about $\frac{1}{4}$ in. from the next. All were probably fragments of large "pack" or gathering baskets.

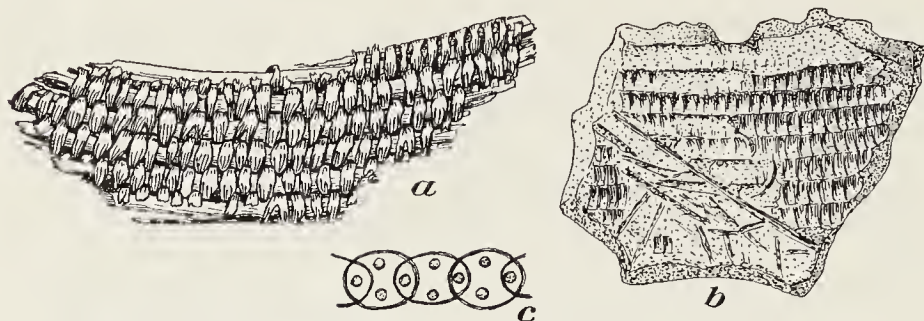


Fig. 10. (a) Basketry, Paiute layer; (b) Basketry imprints, Pueblo layer.

A typical specimen of the close-twined basketry showed 10 vertical elements and 7 pairs of twined horizontal elements to the inch. Some of these may have been fragments of fine weave pack-baskets, but most were probably pieces of winnowing baskets.

Coiled basketry was relatively rare, and mostly the remains of parching bowls if we may judge from the charred condition of the inside, or food bowls. A typical specimen showed 5 coils and 8 stitches to the inch, material apparently all willow. This is illustrated in Fig. 10b. The coil is 3-rod, two members forming the body of the coil and the third, above them, engaging the stitches of the following coil (Fig. 10c).

Also typical of Paiute culture are the pieces of coarse netting of which several were found. The mesh measures about 2 inches, and the cord of which it is made seems to be of Indian hemp (*apocynum*) a two-strand contra-clockwise twist, varying in diameter from 1/16 in. to 3/32 in. These are probably parts of rabbit-nets, once so widely used in the plateau country and in the Southwest in general; but they may be fragments of carrying nets (Fig. 8b).

Strings, other than net fragments, were quite common. All were two-strand and all twisted contra-clockwise. Most were of Indian hemp, of which there seems to be two varieties, a darker and lighter, the former distinctly light-brown, the latter yellowish-gray, sometimes almost white. Diameters ran from that of coarse modern thread to 1/8 in. in diameter. One piece was made of coarser fiber like that of yucca, others of shredded bark, possibly juniper. A number of our strings from Paiute Cave are being held for identification by Mr. James B. McNair of the Field Museum in Chicago, and his report is not yet received. Among them is the piece of bow-string shown in Fig. 9d. This is also a two-strand contra-clockwise twist of vegetal fiber, and is coated with some substance like pitch or beeswax to give it stiffness and wear-resisting quality.

A number of strings from fur-cloth blankets appeared (Fig. 9b, c) all two-strand, *clockwise* twists of strips cut from furry

skins, without the foundation cord so often seen. The fur seems to be jackrabbit or cottontail.

It is not necessary to describe the rags of white-man's clothing found in the upper Paiute layer, for their connection with Indian culture is accidental, but there were two pieces of textile found, probably *not* made by Paiutes, yet of such interest that I think they should be described, or rather *it* should be described, for the two pieces are evidently part of one article. The largest fragment measures, exclusive of trailing strings, about $4\frac{1}{2}$ in. by $2\frac{1}{4}$ in. At first glance, the material seems to be very coarse brownish burlap, but on closer examination it is seen that it is made of wool or hair of some kind, and that the colors are dark-brown and light-brown with occasional threads of dark red. The weave seems to be an over-and-under diagonal type such as may be seen in woven belts and sashes made by the Indians of the middle-west, for example the Osage. The yarn is irregular and apparently hand spun. When examined with a magnifying glass and compared with buffalo hair a strong resemblance is seen, in fact the two are indistinguishable, but for absolute certainty a real microscopic study should be made. Possibly the specimen came from a buffalo hair belt or sash manufactured in the middle west by some Indian tribe from whom it was obtained by an explorer or traveler through whose hands it finally reached the Paiutes in the Moapa Valley.

Among the other objects from the Paiute Cave which reached the Indians through the agency of the whites, are an iron hoe blade measuring $7\frac{1}{2}$ inches by $6\frac{1}{2}$ inches. This is stamped in the upper left hand corner with the name "John Perks," beneath which appears "Hampton" while in the upper right hand is a figure resembling a cattle brand and between the two and below them are two stamped circles. Possibly the age of the hoe can be traced from these stamps, but it is probably not very old. Another object of white man's origin is half of an iron heel plate for a gun and still another an "S" shaped object made of iron by some blacksmith. It is nearly 4" long and may have been used as a steel for striking fire.

Showing contact with the whites but still an authentic Indian implement is the mescal knife shown in Figure 11. This consists of a handle measuring $8\frac{1}{2} \times 2 \times 1\frac{3}{4}$ inches made of some hard heavy wood, possibly mesquite, into one side of which has been set an iron blade an inch and a quarter wide and projecting $2\frac{7}{8}$ inches from the handle. The blade was fastened in its socket with pitch, and the whole implement was smeared with coagulated mescal sap as may be seen in the figure. It was used for cutting out the succulent heart of the mescal plant which formed a favorite article of food. Such mescal knives with iron blades have been collected among the Colorado River tribes and specimens with stone blades are reported from a

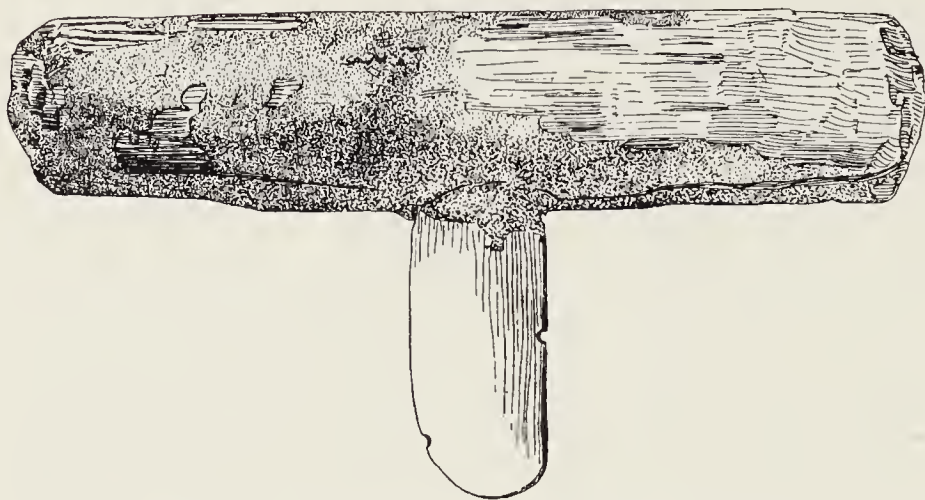


Fig. 11. Mescal knife with wooden handle and iron blade.

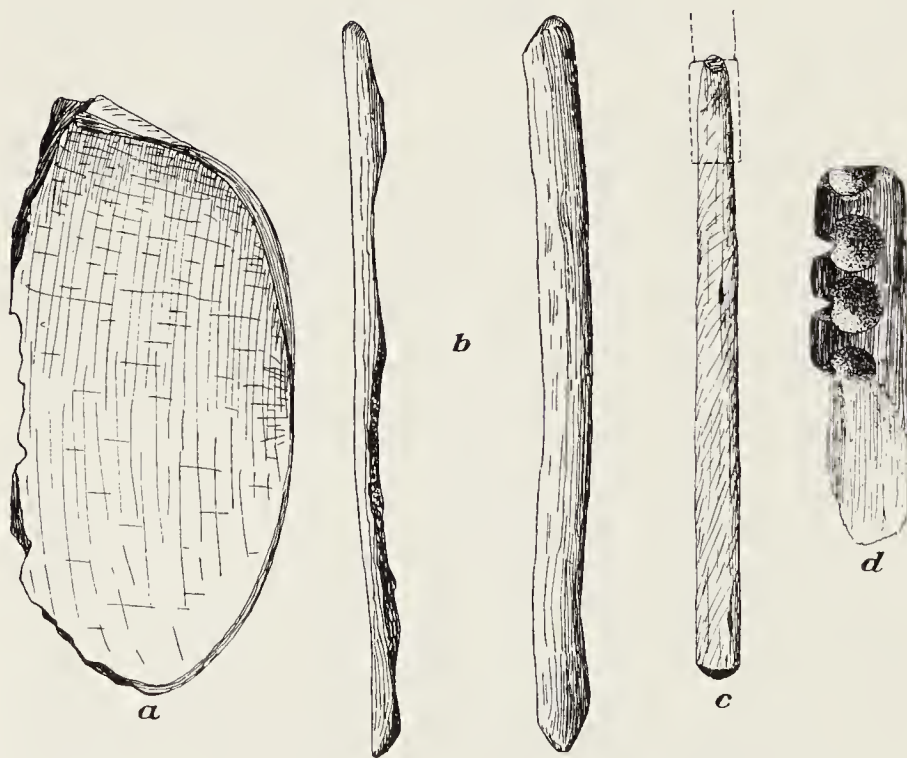


Fig. 12. (a) Fragment of horn spoon, (b) chipping tool of antler, (c) wooden fore-shaft for fire drill, (d) wooden hearth for fire drill.

cave near Flagstaff, Arizona and from a cave near Alpine, Texas. Characteristically Paiute is a bowl made from the carapace of the desert tortoise. To make this bowl, the edges of the shell were cut off except at one end and the bony processes removed from the inside. The bowl measures $8\frac{1}{4}'' \times 5''$.

A fragment of ladle or bowl apparently made from mountain sheep horn, is shown in Figure 12a. Its original form could not be determined, but it probably represents a type found today among the tribes of the Plateau, the Southwest and out on the Plains, even among such advanced people as the Hopi.

Made of deer antler is the cylindrical implement shown in figure 12b. It measures about $6''$ in length and $\frac{1}{2}''$ in diameter and was probably used in flaking flint. One side is perfect while the other has been gnawed by mice until the original contour has disappeared. No bone awls were found but there was one splinter of bone from some large animal which had been rounded on one end and used as an implement of some sort.

There were three fragments of bows, one about half of the weapon and measuring $2'4''$ in length. It was much wasted by decay but it must have been originally over four feet long and an inch and a half in width at its widest point.

It was rather flat on the back and rounded on the belly as had been a smaller bow of which two fragments were obtained. The material of the larger weapon was apparently juniper, the smaller one doubtful.

No whole arrows but a number of fragments were secured both of the cane main-shafts and wooden fore-shafts, some of which had been used without stone points. One cane arrow-shaft showed a decoration consisting of a spiral black line painted on a red ground. Three feathers were evidently used which were bound to the shaft with sinew. The fore-shafts were of light colored wood, unidentified. The longest was nearly ten inches and one had been wrapped with sinew to prevent splitting. No stone arrow-heads were found although the butt end of a flint knife appeared.

Other objects made of cane were a shaft for a fire drill somewhat broken but still measuring $19''$ in length, another cane which had been used for applying pitch—and still another which seems to have been a container for pitch. The wooden fire-drill fore-shaft shown in Figure 12c, was found with the main shaft, above mentioned. The wooden fire-drill hearth shown in figure 12d was not far distant, probably all three had belonged to the same outfit. The wood seems to be mesquite.

Speaking of cane, upward of 200 nearly complete arrow-canes were found in the Paiute layer, many of them showing cutting, in some cases with stone knives, in others apparently with steel. Prob-

ably these had been gathered by some arrow maker. Other wooden objects were digging sticks made of creosote brush sharpened at one end, showing wear as if used for digging storage pits. To assist in this operation doubtless, were fragments of tortoise shell, of which we found several much worn on the edges, as if used to scrape out the dirt loosened with the digging stick. Another creosote brush stick had been bound at one end with a string made of yucca fibre and a little further down with an Indian hemp string.

Of especial interest were the corn cobs found in the Paiute layer. Like the Pueblo layer cobs, they must have belonged, according to Mr. McNair, to either the starch corn or flint corn varieties, probably the former. Most had ten or twelve straight rows but a very few had fourteen rows while one had ten to twelve spiral rows. In length they varied from $4\frac{1}{4}$ " to $6\frac{1}{8}$ ". In general they differed from the Pueblo cobs in being larger and in the fact that no eight rowed cobs appeared.

There were also husks, pieces of stalks and cob-stems but these had no particular character. Other crops were represented by the seeds of several members of the squash family, by pieces of squash rind apparently of hubbard type and by a number of pieces of dried young squash, variety unknown.

Specimens of Indian Millet (*Eriocoma cuspidata* Nutt) and Wild Millet (*Panicum Urvilleanum* Kunth), identified by Mr. McNair, show that these plants were gathered by the Indians, probably to use the seeds for food.

Other botanical specimens were various pieces of bark, roots, sticks and grasses which still remain to be identified. Among these are a number of Indian hemp stems with a little fibre still adhering, probably *Apocynum*.

Besides the fragments of tortoise shell before mentioned, the only animal bones recovered were small broken pieces probably from jack-rabbit and cotton-tail. There were however some small thongs and pieces of buck-skin and raw-hide, the latter probably modern cow-skin, also a feather from a species of crow. There was also a raw-hide patch from the moccasin, still showing the sinew thread. This completes the collection except for a piece of rock-salt evidently from the mines below Saint Thomas.

CONCLUSIONS

Examining the pottery from the Pueblo layer, the first impression is that, on account of the relatively large proportion of plain and painted sherds and the small proportion of corrugated, the whole deposit should be assigned to our "Lost City" period, or first phase of the Pueblo occupation of the Valley. On closer inspection however, we find that the corrugated ware is more like that of Mesa

House and that the gray bowl fragments with black decoration resemble the bulk of the painted ware found at the same place, so it will probably be more nearly correct to date the latest Pueblo occupation of Paiute Cave as late Pueblo 2 or Early Pueblo 3, rather than straight Pueblo 2.

The presence of the storage pits and the scarcity of anything suggesting habitation in the Pueblo layer, leads one to believe that the cave was used as a storage place and not as a residence by these people. On the other hand, the relative richness in camp refuse of the Paiute layer, indicates that these latter people made their home in the cave and that various industries such as arrow making, were carried on.

Due to the fact that there was no pottery in the Paiute layer and that the Pueblo layer was so poor in other artifacts, there is little material for comparing the two cultures. We can say however, that the Paiute coiled basketry in this cave, was coarser than that of the Pueblos and that their corn cobs were somewhat larger and not so varied as to number of rows. We can also add that all of the Paiute string is twisted contra-clockwise while the Pueblo cordage is sometimes clockwise. Both peoples, in this cave at least, made their rabbit-skin robes of two strand yarn twisted clock-wise, without the central cord of hemp or yucca fibre frequently seen.

We also learned that the Moapa Paiutes used a slender bow more than four feet long, with painted arrows of cane, provided with wooden foreshafts from which the stone arrowpoint was frequently omitted, in which case, the foreshaft itself was pointed, also that they used the "T" shaped mescal knife. That they occupied the cave up to and after the coming of the white man was obvious, from the rags, iron, etc.

We have already explained the origin of the thin layers or laminae of clay which covered and separated the Indian strata at the mouth of the cave, and this was comparatively easy to interpret. The two dry mud layers however, offered a weightier problem. They were pure unstratified mud and in the back of the cave where they came together, there was a distinct line of cleavage between them which we called the "Paiute floor" as the upper mud deposit here contained imbedded Paiute artifacts.

The mud had evidently flowed in, in a semi-liquid state, in both cases; but we were puzzled to note that in spite of this, the Pueblo layer was quite dry although it lay directly beneath the thickest layer of mud.

Finally this explanation offered itself. Shortly after the Pueblos had abandoned the cave, a heavy cloudburst, washed down a thick river of mud from the clay hills. This came so quickly that it stopped up the drainage channel under the natural dam at the mouth of the

gully. Then the mud rose behind the dam until it reached the level of the cave mouth, then it poured in like a flood of lava. It came so quickly that it sealed over the dry dusty Pueblo deposit in the cave without dampening it much except a very little near the top. Immediately it stopped raining, no more mud came down, the underground drain channel opened up again and the mud ran out until its surface was again lower than the cave mouth. Succeeding rains being gentler, without stopping the channel again, gradually washed the rest of the mud out of the gully, but the layer in the cave remained.

Then the Paiutes came and years afterward the same thing happened again, forming the upper mud layer. Perhaps this was not as heavy as the first because the refuse deposits in the cave had in the meantime, raised the level of the entrance. The cave can never be flooded with mud again because now the natural dam blocking the mouth of the gully has been eroded down to such an extent that any river of mud would run over the top of it instead of backing up into the cave.

Most interesting of all our conclusions however tentative and unreliable they may be, are our interpretations of the clay laminae in the cave mouth of which, as before stated, there were on the average, 56 to the inch, each representing a heavy rain-fall.

Inquiring among the residents of the Valley as to the average number of heavy rains per year, we received answers, as low as two or three and as high as five or six. My own experience in the Valley, covering three years, supports the lowest estimate and in this I am backed up by Longwell who states in his report (*op. cit.* p. 14) "not infrequently local areas receive the greater part of their annual precipitation in one or two cloud bursts."

On the basis of two rains per year, each inch of lamination would represent 28 years and this we will use provisionally, as a time scale. The upper layer marked "sand" in the section (Figure 3) which was covered with 3" of lamination proved, a little further back in the cave, to contain Paiute objects; so on this basis, the last Paiute occupation, extensive enough to reach the cave mouth with its refuse, was laid down,—three times 28 years, or 84 years ago, which is to say, in 1845.

At 21 inches deep, another layer marked "soft dirt, charcoal, and cobs," reached the front; this traced back, proved to represent the main period of occupation by Paiutes, which is thus dated at 1341 A.D.

Sixteen inches below was still another Paiute layer which according to our scale was 448 years older, or somewhere back in the year 893 A.D.

Below this was the unlaminated mass of dried mud which ran all the way back to the rear wall of the cave, forming the layer

which definitely separated the Paiute deposits above from those of the Pueblo below. Near the right hand edge were about four inches of lamination showing a lapse of perhaps 112 years, making the close of the Pueblo period here, something like 781 A.D.

This time was arrived at by working with the laminations only, ignoring the Indian refuse layers which must have taken some time to accumulate; so that in reality if our time scale is correct, the last Pueblos abandoned the cave somewhat earlier.

The main Pueblo layer was 16 to 18 inches thick but we do not know how long it took to accumulate. We do know however, that there was a laminated layer under it six inches thick, representing 168 years; then on below in the right hand corner was still another layer showing human occupancy and extending down to the rock bottom of the cave mouth. The date of this last and oldest layer is then at least as early as 613 A.D., which represents the first Pueblo use of the Paiute cave. If there were ever any other deposits still older, the Pueblos with characteristic but aggravating neatness, swept them out and destroyed them; at least we found no traces of Basket Maker or earlier peoples.

Previous work in the Valley had inclined us to the theory, that the Pueblo people had left the country about the beginning of the Pueblo 3 period, which I had guessed to be about 800 A.D. and it is interesting to note how well our time estimate of 781 years, based on a two-rains-per-year interpretation of the laminae in Paiute Cave, fits in with this theory.

And finally, we have another important bit of information if, again, our time measure is reasonably accurate. In the one part of the cave where the record of the laminae is legible in the deposit, dividing the Paiute from the Pueblo layer, we have only about 112 years represented. The inference is, that the Paiute or a similar people followed the Pueblo very closely in the occupation of the Valley and the suspicion is strengthened, that the former had at least a hand in driving the latter from this precious oasis.



PITS 1-7, PAIUTE CAVE, OVERTON, NEV.

No.	Diameter E-W	Diameter N-S	Orig- inal Depth	Pres- ent Depth	Lining	Form	Remarks (Contents, etc.)
1	39"	30"	22"	50"	2" grass & brush	Oval Bowl- shape	Plain and B/G Pueblo pottery, rabbit bone, piece fur blanket - yarn, hemp - stalks, bits firewood.
2	{ 17" top { 19" bottom	{ 22" top { 25" bottom	23"	54"	Grass & brush	Oval Pot- shape	Husks in pairs, plain Pueblo pot- tery, corn cobs, bark strips.
3	20"	28"	9"	.....	Traces grass	Oval bowl	Traces hemp- stalks, plastron of land tortoise. Pit had been filled with mud.
4	{ 24" top { 28" bottom	{ 30" top { 32" bottom	17"	62"	a little grass	Oval pot-sh.	Cobs, husks, fire- wood, hemp-stalks. Slab cover over pit.
5	{ 14" top { 24" bottom	{ 10" top { 24" bottom	18½"	66"	Brush	Oval-top pot-sh.	Cobs, husks in pairs, plain Pueblo pottery, pot - coil, knotted fiber, rab- bit fur.
6	30"	30"	16"	52"	Traces brush	Circular bowl	Black-on-gray Pue- blo pottery, hair- string, husks in pairs, fiber, cobs, hemp-stalks.
7	20"	24"	16"	54"	Traces brush	Oval bowl	Flint - chip, hemp- stalks.



Date Due

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